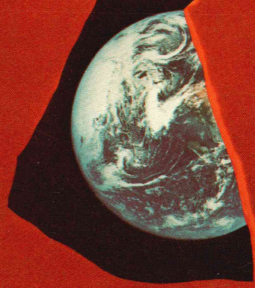
Museum News

July/August 1976



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Museum News

Cover
See page 15 for a special section on technology.

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Roberta Faul
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Jean Carcione
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Editorial Secretary/Assistant

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From the Director

At 11:00 in the morning of May 10, 1876, President Grant pulled a lever to set in motion the great Corliss engine, thus officially opening the Philadelphia Centennial Exposition. Because a recession was then in progress, few could have been aware that by this act the President was opening not just an exposition but a new era for America and for the world, a period of rapid industrialization and of burgeoning technology.

Rising 40 feet above its base and weighing 1.7 million pounds, the Corliss was the largest steam engine in the world. The gigantic heart of the Exposition, it delivered enough power to drive all the machinery in the 12-acre Hall of Mechanical Engineering, as well as for the entire exhibition of 70 acres of combined floor space in five halls. The great engine was uncompromisingly functional. It was entirely free of the pseudo-Gothic crockets and cusps, wiry Corinthian colonnettes, cast-iron reliefs and polished brass finials of the other displays, many of which are shown in the period exhibition at the newly restored Arts and Industries Building of the Smithsonian. Though the engine was criticized for its lack of such adornment, visitors were fascinated by the near-silent rhythm of its two vast pistons and were awed by the 1,600 horsepower it generated. Bertoldi, sculptor of the Statue of Liberty, saw in it a grace equal to that of the human form, but for the crowds that daily flocked to watch it, the Corliss engine provided an exhilarating glimpse into the future.

In recent years, however, observers of the American scene have increasingly viewed with alarm what they consider the evils of technology run rampant. What has long gone unquestioned as "progress" is undergoing reevaluation. Our lives are surrounded by and interwoven with technology at every level. No matter how deeply one retreats into the wilderness, there is scarcely a sky without jet trails. We live by instant communication. Our pocket calculators can, in seconds, provide answers that would have taken a team of dedicated mathematicians hours of patient figuring to produce.

Of necessity, museums also are more aware of technology. It enters into cataloguing and information systems, in interpretation and education, and in the duplication of records. It is an invaluable aid to research and to the enhancement of human knowledge.

Yet all this is inevitably viewed against the realization that we have, through technology, developed the capacity to destroy our fragile world several times over; one wonders if once really would not be sufficient for even the most destructive and misanthropic among us. Technology has placed a potentiality for violence in the hands of almost anyone.

Basic questions must be constantly posed, thoughtfully pondered and answered as responsibly as we are able: Can we control the forces within ourselves and channel them toward the realization of the ideals we share? Can we recognize our all-too-human weaknesses and steel ourselves to make those decisions that are necessary for the future of us all, not just to satisfy the expediency of a disquieting present?

As unique institutions dedicated to the creative and constructive aspects of our traditions and societies, museums in all fields, large and small, must not only face the challenge of technology by exemplifying its constructive use, but also answer those basic questions and do their best to provide a much-needed moral leadership. △

Richard McLanathan

International

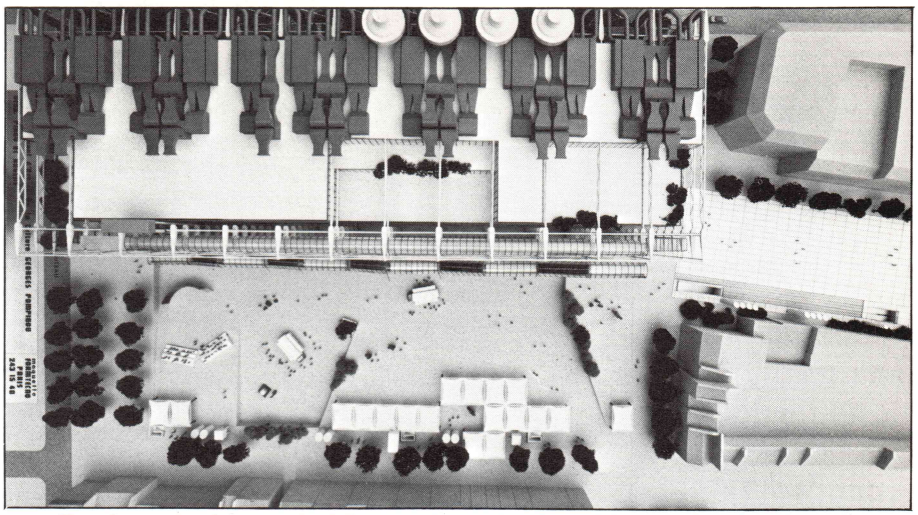
Beaubourg—The French Acropolis

Susan M. Yecies

Eager to retain its role as a cultural leader, France has built a contemporary Acropolis in the center of Paris, designed to serve as a meeting ground for different forms of expression—painting, sculpture, music, film and industrial design. Officially named the Georges Pompidou National Center for Art and Culture, Parisians call it Beaubourg after the déclassé neighborhood in the first arrondissement where it is located.

In the words of one French cultural official, the center's aim is to "capture intellectual trends and contemporary art in their most varied forms and, through comparison and analysis, to favor creation—a creation that will necessarily spread far beyond the center's confines."

Susan M. Yecies *is program coordinator, AAM/ICOM.*



Beaubourg is characterized by a tri-dimensional steel frame, glass facade and vast, flexible interior spaces.

President Georges Pompidou initiated the idea of establishing a 20th-century art center in the middle of Paris in 1969. A 1970 international competition produced 681 designs from architects in 50 countries. The following year, an international jury chose the plan submitted by the British and Italian architects, Rogers and Piano, working in conjunction with the engineers, Ove Arup and Partners. Built at a cost of $210 million, the center is scheduled to open late this year with a staff of up to 1,000 and an estimated daily attendance of 10,000.

The Beaubourg is located on the site of the Old Halles Market, only a few minutes' walk from the Place des Vosges and Musée Carnavalet.

The building is 500 feet long, 200 feet wide and 150 feet high. With a total area of one million square feet, it occupies half of the Beaubourg Plateau.

Maximum flexibility was one of the chief design requirements and the winning team of architects achieved this with striking simplicity. All functional facilities are set along the outer walls. Mechanical systems —air conditioning, electricity and plumbing—adorn the eastern wall. Rather than being hidden from sight, they are painted in bright, aggressive colors. Escalators and elevators are visible on the western wall, which will be transformed by projections into a gigantic, moving electronic billboard with messages for the public.

A large plaza slopes toward the front of the main building, forming a huge amphitheater that will be used for open-air events. Two smaller plazas are intended as rest areas. Other outdoor events will take place on the roof of one building in the complex, which was built completely underground so that it would not obstruct the view of the 16th-century Eglise Saint-Merri.

The large plaza is protected from the noise of street traffic by several rows of trees and is edged on two sides by shops, cafes and houses that open directly on the square. The area is served by electric, water and sound systems to allow programing of a wide variety of activities. Plans for the area range from art exhibitions, poetry readings, picnics and chess games to flower selling and blood donating.

The Beaubourg will be the home of numerous institutions:

△ National Museum of Modern Art —The museum will concentrate its collections and exhibitions on works from the beginning of the 20th century to the most contemporary in a wide range of media—painting, sculpture, photography and filmmaking. Pontas Hulten, known as a champion of contemporary art, is the museum's director.

Hulten, who comes to the Beaubourg from Stockholm's Moderna Museet, plans to build a collection that includes non-cubist, non-French artists and movements. Included in the collection will be Russian constructivism and American Pop.

The museum's reference center will act as a current information center as well as an art research resource. It will include information and documents on the history of 20th-century art and the development of international contemporary art. The information center will provide materials on artists, artistic events, bibliographies and specific topics. Artists and designers will be able to request information on individuals and organizations that might be interested in their work.

The museum also contains lecture halls, rooms for slide shows, information offices and storage rooms that may occasionally be made accessible to the public.

△ Acoustic/Music Research and Coordination Institute—Under the direction of Pierre Boulez, former conductor of the New York Philharmonic, this new interdisciplinary research institute will bring together musicians and scientists for research on musical phenomena. The pure researcher, composer, instrumentalist, acoustic specialist, and scientists belonging to these disciplines will cooperate in theoretical and practical research. IRCAM study undoubtedly will lead musical composition into new and unexplored regions.

△ Public Information Library—This library will accommodate up to 1,200 persons conducting research in all disciplines. Audiovisual and pictorial materials as well as up to one million books will be available to researchers through an advanced data processing system that is unique in France. Special emphasis will be placed on current developments and events in the library and an adjacent news room. A wide range of books, periodicals and newspapers from around the world will be available in the news room. The area also will have audiovisual facilities and a section reserved for children.

△ Industrial Design Center—This center will emphasize aspects of design and evolution in contemporary life including urban planning and life, architecture and graphics. It will have facilities for temporary exhibits, permanent exhibitions on past and present industrial design, publications and research. A bureau of the center will provide research and consultant services for public bodies and local communities.

△ General areas—The Beaubourg also will have a multipurpose room, a cinema for classic and contemporary films, conference and lecture rooms, rest areas and a day nursery.

Except for West Berlin's National Gallery, designed by Mies van der Rohe in 1968, the Beaubourg is the only major center for art and culture that has been built in Europe since the war. More important, it is the first cultural megastructure of its kind anywhere. △

Perspectives on Technology

Maureen Robinson

An Optimistic Public Attitude

Despite the fact that Americans can be heard to speak occasionally of the "good old days," 75 percent of the persons polled by the National Science Foundation thought that life had changed for the better as a result of science and technology. Fifty-six percent listed satisfaction or hope, as opposed to fear or alarm, excitement or wonder, indifference or lack of interest, as descriptive of their general reaction to science and technology. The survey, conducted in 1974 among 2,074 persons 18 years of age or older, is part of a continuing effort on the part of the National Science Foundation to gauge the public's attitudes toward science and technology. When compared with the results of a similar survey done in 1972, the 1974 study reveals that 57 percent believed that science and technology had done "more good" than "harm" compared to 54 percent in 1972, and that in both 1972 and 1974 the scientist was ranked second only to the physician in prestige by those polled.

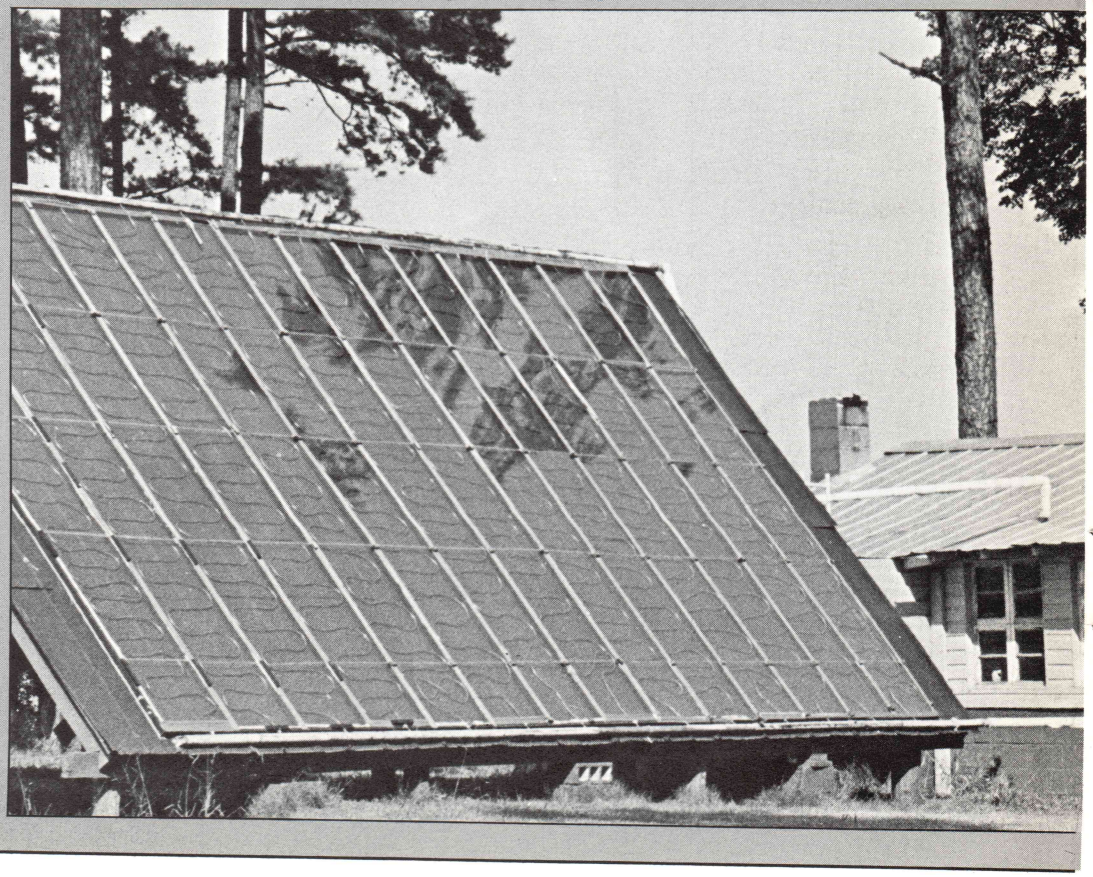
If the basically optimistic outlook discovered by NSF needed confirmation, it could be found in the National Endowment for the Arts' 1972 museum survey, *Museums USA*, which showed that 38 percent of all reported visits were made to science museums which comprised only 16 percent of the museums surveyed.
(*Science Indicators,* 1974, $4.60, U.S. Government Printing Office, Washington, D.C. 20402.)

Harnessing Nature

In 1973 and 74, when public awareness of the energy crisis was at a peak, museums around the country began lowering thermostats, turning off lights and in some cases, shortening hours or closing. Although many museums are now more concerned with the economic crisis than the energy crisis, a few have begun using, at least for part of their needs, alternative sources of energy. A solar heat unit was installed by the Nature Science Park, Winston-Salem, North Carolina, to heat its Sun, Wind and Water Building. Water pumped through copper tubing picks up heat absorbed by the black panel and stores it in an 850-gallon tank. A timer turns off the pump at sunset. When the tank is fully insulated it will hold heat for a minimum of 36 hours. Future plans call for solar heating in other buildings at Nature Science Park, including the main museum.

The Hagley Museum, Wilmington, Delaware, is reverting to a tried and true source of power—water. The museum, located along the Brandywine River, is reconstructing Delaware's first water-powered electric plant as a source of electricity for the museum and as an exhibit. The New Century Power House, erected in the Hagley Yard in the early 1890s, will be reconstructed with a turbine installed in the existing foundation of the plant. On one floor visitors will view an exhibit on hydroelectric power. In another room, separated by a protective glass wall, they will see the generator floor housing a 1920 working generator, an old slate control board and modern

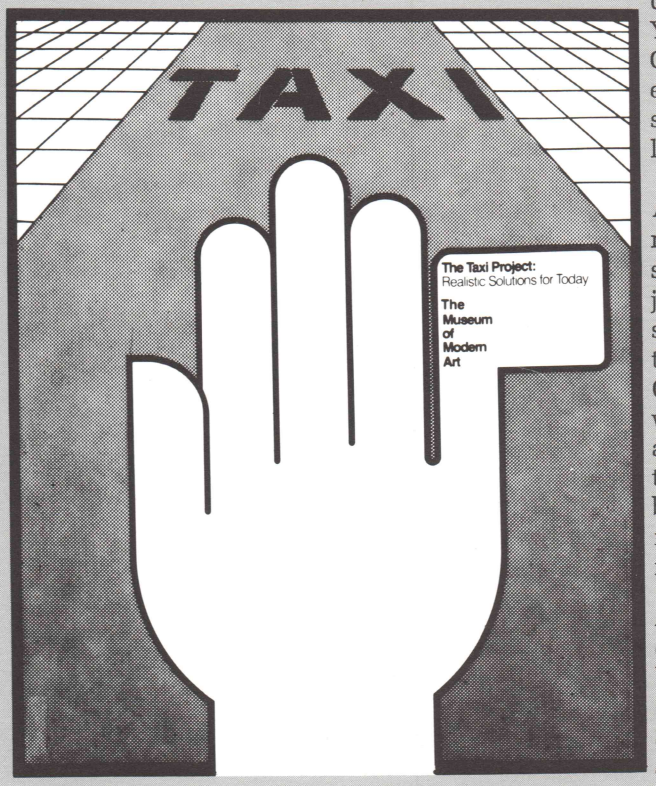
Below left to right: The Nature Science Park's solar heating plant; the turbine that will power the Hagley Museum's restored power house; ERDA's 125-foot tall windmill



control panel as well as a 1901 model Woodward governor. The original power house used the Hagley Dam as its power source. The new plant will be served by a dam further upstream, the power of which is three times greater. The output is expected to be 375 kilowatts using about 500 horsepower. In case of drought or other natural disaster, the museum will be able to switch immediately to the Delmarva Power Company's available power, which may be bought by the museum on a standby basis.

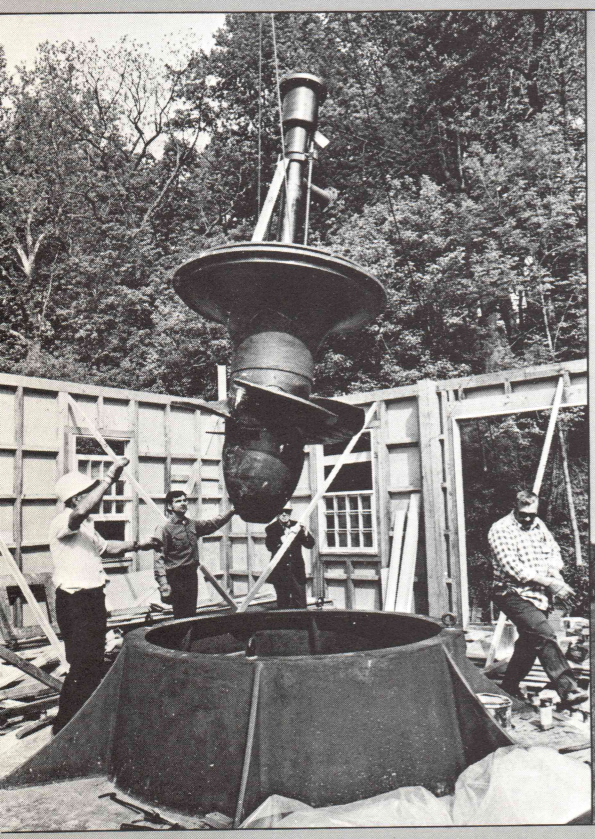
An article in a recent issue of *The Explorer,* published by the Cleveland Museum of Natural History, described the newest wind turbine, operated by the Energy Research and Development Administration. Located near Sandusky, Ohio, the 125-foot-diameter rotor spins at 40 revolutions per minute in an 18-mile-per-hour wind and produces 100 kilowatts of electricity —enough to supply the power requirements for about 25 homes.

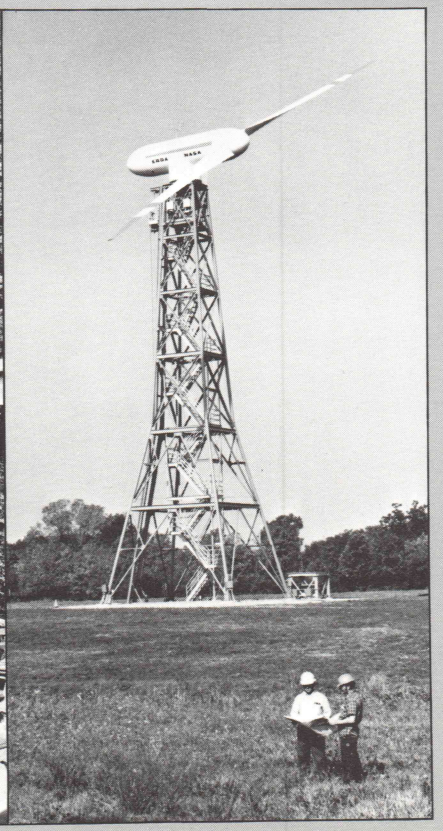
Taxi! The Design Department at the Museum of Modern Art has entered the urban fray with *The Taxi Project,* an exhibition that explores some design alternatives for one of the most popular forms of urban transport. At the invitation of the museum, four companies, two American and two European, produced working prototypes of taxicabs that would conform to specifications developed by the museum and the New York City Taxi and Limousine Commission. These specifications emphasized economy, comfort, safety and the reduction of pollution and traffic congestion.



A well-designed, efficient taxi represents a potential boon to more segments of the population than just the 2.5 billion persons who stand on corners across the country each year trying to flag a cab. Cleaner air and fewer traffic jams would benefit all city residents and are more likely to result from the widespread adoption of a better design by the taxi industry rather than from massive government expenditures.

A catalog describing the history of the taxi and its future possibilities has been prepared for the exhibit, which will run through September 7.





Native Ingenuity

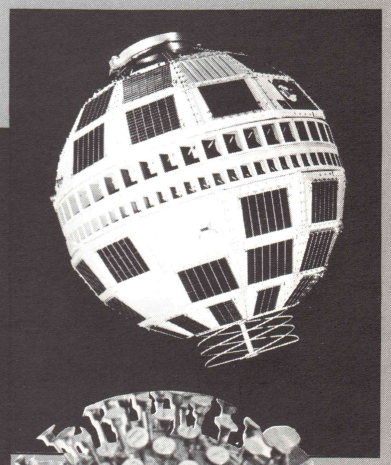
Technology is a word with a newly minted shine that often conjures up computers and journeys to the moon, but the Ontario Science Center's new exhibition, *The Native Heritage,* will have us marveling at the technological ingenuity of the birchbark canoe and the sealskin kayak. The exhibit, which runs through September 6, stresses the technological processes of two native cultures, the Woodlands Indians of central and southern Ontario, Quebec and the Maritimes, and the Inuit of Northern Quebec and the Northwest Territories. By means of artifacts and demonstrations by native people of both traditional and contemporary skills, visitors will be able to compare the different solutions each culture has devised to fulfill their basic needs, given the differences in their resources.

Unifying Force

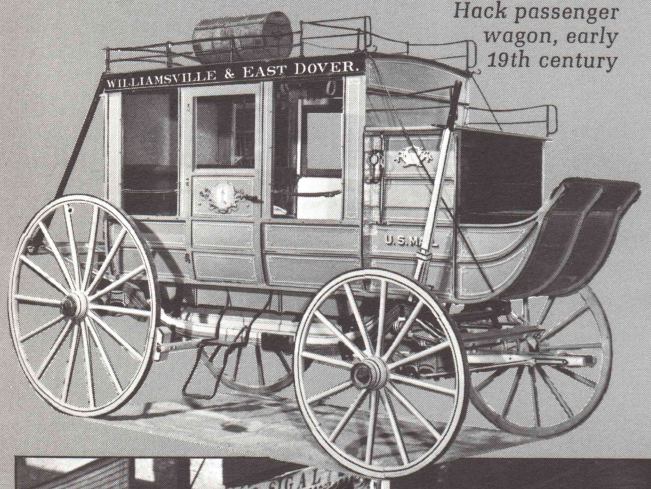
A major Bicentennial exhibition at the Smithsonian's National Museum of History and Technology abounds with evidence of technology's pervasive influence on American life. *A Nation of Nations* reflects America's diverse origins, paying tribute to the technological innovations that helped to unify many cultures into one nation.

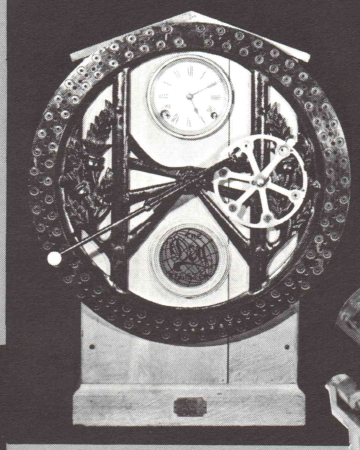
Among the thousands of objects assembled for the exhibition are television screens showing examples of satellite-transmitted broadcasts; an operating pencil-making machine that demonstrates mass production; a 31-foot windmill; and an 18th-century carder, the British machine that helped bring the Industrial Revolution to the U.S. A working ham radio station has been installed in the museum, and visitors may listen to live short-wave transmissions on sets of earphones.

The Telstar I experimental communications satellite

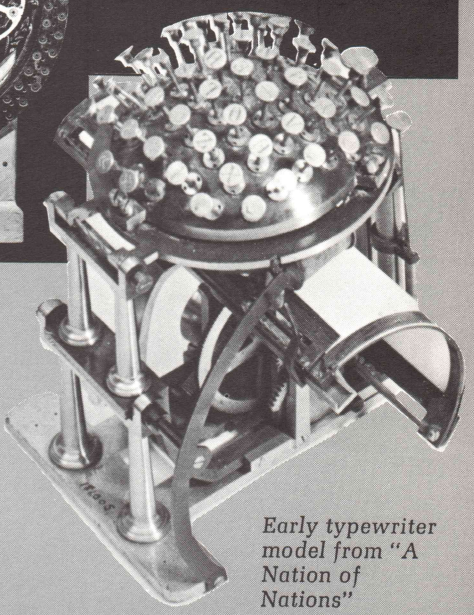


Hack passenger wagon, early 19th century





The Dey Register, an 1889 time clock (above)



Early typewriter model from "A Nation of Nations"

Clothing sellers, Maxwell Street, Chicago, 1906

Is Bigger Better? In its Bicentennial exhibition, FUTURES, the Franklin Institute Science Museum challenges many of the assumptions Americans have held about the limits, or lack of limits, to technological growth. The 11 major areas of the exhibit have been designed to show that the future is shaped by the choices people make today. One area, "Limits and Values," is a mini-encyclopedia of the problems that result from physical, social and individual limits. Another, "New Technologies and Opportunities," illustrates the potential of such technological advances as solar energy, computers and electric cars. The exhibition provides visitors with an opportunity for a thoughtful consideration of the country's future as well as a chance to view its considerable scientific and technological achievements.

Visitors can prepare themselves for FUTURES by viewing the Institute's other major Bicentennial effort, *Mirrors of America—Reflections on Industrialization*, which will continue until the end of the year. The show traces five periods of technological growth and artistic expression in America —the Craft and Steam Ages, the Centennial Era and the Electric and Electronic Ages. Using implements, objects, machinery, music and audio – facsimiles of work noises that are characteristic of each period and communicate their ambiance, the exhibit will allow the visitor to see and experience 200 years of social and industrial development.

"The Written Word Endures"

The National Archives has organized an exhibition for this Bicentennial summer called *The Written Word Endures: Milestone Documents of American History,* which features the treaties, acts, Supreme Court decisions, patent applications and other documents that record, as no other medium has, the nation's development. Implicit in the organization of such an exhibit is the notion that the written word's endurance is in some question, that communication by sophisticated electronic technology is in the process of supplanting the page as the source of information for most Americans.

The Franklin Institute in Philadelphia has taken a more comprehensive view of the relationship between technology and the written word in the exhibition PRINTWORLD. Visitors will be able to learn the history of printing from its most labor-intensive days to today's electronic and computerized typesetting and color printing, and understand the processes and technology that make it possible to find the morning paper at the door, learn the contents of a tin can and purchase cheap but quality paperback books in every drugstore.

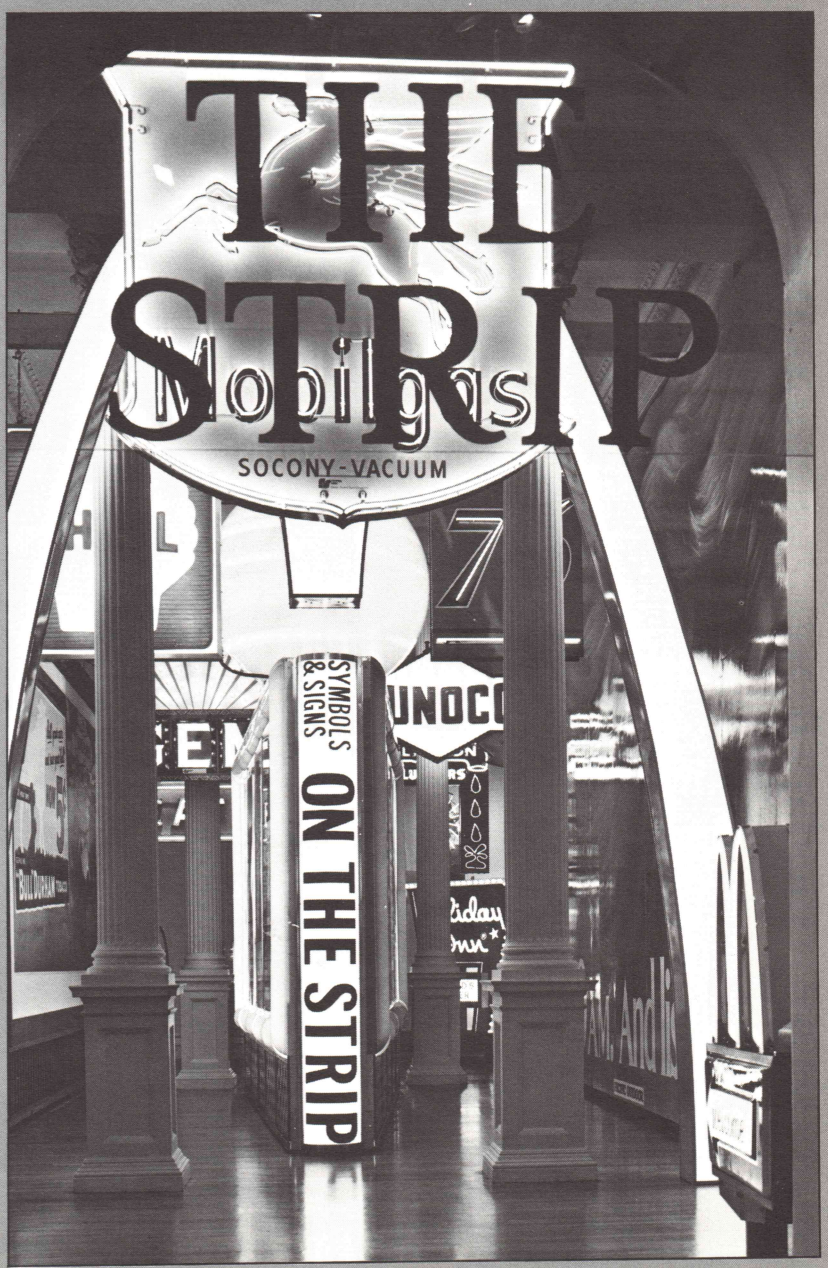
Pennies From Heaven

The Field Museum of Natural History in Chicago is offering a $100 reward to the finders of newly discovered meteorites. How can you tell if the rocklike object in your backyard has fallen from space or was just tossed over the fence by the kids next door? For one thing, meteorites weigh about 50 percent more than ordinary rocks of the same size and for another, they sometimes have thin, dark brown crusts that have formed during entry into the earth's atmosphere. If you think you have found a meteorite, Paul Sipiera in the museum's Department of Geology can verify the find and authorize payment of the reward.

On the Street Where You Live

The signs that flash past us along the highways inviting us to stop and rest, stop and eat, and stop and gas up can now be seen from the perspective of two miles an hour rather than 55 at the Renwick Gallery in Washington, D.C. Robert Venturi and Denise Scott Brown, probably best known for their study of the Las Vegas "Strip," have organized *Signs of Life: Symbols in the American City,* an exhibition that looks at what, environmentally and architecturally, *is* rather than what should be.

What *is* turns out to be not only McDonald's familiar Golden Arches and Mobil's Flying Horse, but the streets where we live and the rooms we carefully decorate. These "signs of life" are not seen as camp or pop, but are treated as evidence of conscious choice, deliberation and the fulfillment of some aspect of the American Dream. *Signs of Life* demonstrates the impact of high speeds, mobility and instantaneous communication on the way in which Americans have built the landscape and chosen the paraphernalia of modern life.



A segment of "The Strip" section from the Renwick "Signs of Life"

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Editor's Notes

From time to time this space has been used to introduce a new department or a member of the MUSEUM NEWS staff, to tell you about the theme of the current issue or of plans for the future. I wanted to set aside a place this month, because this is my last issue as editor, to thank you for the years that I have enjoyed as a member of the AAM staff.

Not long ago, I telephoned Jim Short at Colonial Williamsburg to ask him to write about accreditation for an upcoming issue, and we discussed my plans to leave the AAM in early July. As we talked about the past and about the future, he read me a passage from the foreword of Kenneth Silverman's book, *A Cultural History of the American Revolution.* Silverman acknowledges two friends, saying, "I am grateful . . . [to you] for having shown me that education is a form of pleasure."

Working for you these last five and a half years has been, if I may extrapolate from Mr. Silverman, both an education and a pleasure. Like many others, I came to the AAM a willing student, and from all of my associations with you over the years, have found you to be more than willing teachers. The satisfactions of my years as editor, and there have been many, I owe to you, as well as to the members of the MUSEUM NEWS staff and publications committee.

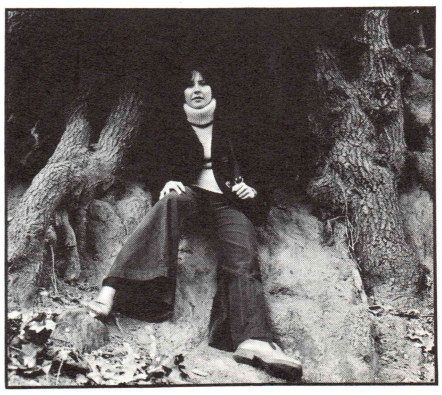
In the spring I found myself thinking about the future, and resolved that I wanted to remain involved with the work of museums. To do that I have made plans to open a small office in Washington with several ideas in mind—to help museums and other cultural organizations explore and better use the remarkable resources that are available to them in this city; and to work with museums, of all disciplines, in editorial and publications activities, research, and development. I am excited as well by the opportunities to actively promote museum interests by writing for magazines that are expanding their coverage of cultural organizations. Goethe wrote in 1825 that ". . . we learn only from those whom we love," a statement to which I happily attest.

About This Issue

Last winter, as the planning began for this issue, I was reading an article by Samuel Florman, taken from his book, *The Existential Pleasures of Engineering.* Florman, who is an engineer-builder and has written on art and technology, was rationally taking on the antitechnologists—we have all cursed machines at one time or another and blamed them for the human condition—and was doing an excellent job of it. Here, I believed, was an alternative to publishing a Bicentennial issue this summer that would enjoin our readers, as so many other publications have, to continue searching for their roots through Bicentennial celebrations. And so the subject became technology and its application to all of us in our personal—and professional—lives.

Joining Mr. Florman in this issue are Lois Brand on Raymond Loewy, the renowned industrial designer; Victor Danilov with his perspectives on European science and technology museums, which date from the 19th century; a set of technology notes by Maureen Robinson, of the MUSEUM NEWS staff; and a short history of the metric system and of America's plans to go metric. James Goode has also contributed a delightful article on the history of the Smithsonian Institution, with its nearly unequalled science and technology collections.

Roberta Faul



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Going Metric

Roberta Faul

It will be a close race between the United States and Great Britain as to which shall first adopt the metric system. . . ." (1902, first director of the National Bureau of Standards)

One of the longest running debates in America's history has been whether to adopt the metric system as our primary language of measurement. For nearly two centuries Congress studied and even advanced proposals to become metric, but rejected the idea because our major trade partners were not using the metric system. By 1965 or so that position was no longer defensible: Great Britain and subsequently the Commonwealth countries announced plans to adopt the International System of Units (the modernized metric system), leaving the United States as the only industrially developed nation in the world that had not converted or begun converting.

The debate is finally over: America is going metric. While the United States has enjoyed a unique position in technology and commerce, there has been evidence in recent years of declines in American technology development and in our share of world trade. The Metric Conversion Act, signed into law by President Ford on December 23, 1975, signals the government's awareness that failure to metricate could seriously jeopardize United States' interests in trade, technology and defense. After nearly 200 years of debate, Congress finally has committed the United States to a national policy of metric conversion, albeit on a voluntary basis, that will put the nation in step with a metrically oriented world market.

The metric system was born during the French struggle for independence. In 1790, the year after the French monarchy was overthrown, the Academy of Science in Paris began formulating a new system of weights and measures. The principles of the system were a natural scale of length, which could be verified and reproduced scientifically, and a decimal division of measures. Its keystone was the meter, a unit of length defined as a fraction of the earth's circumference (specifically, it was the ten-millionth part of the meridional distance from the the North Pole to the Equator through Paris).

Unlike the inch-pound system used across the Channel, the metric system was rational, internally consistent and simple. From the meter, the standard for length, were derived standards for mass (gram) and volume (liter). All other units expressing length, mass or volume were formed from these base units by adding a standard set of prefixes that differed by powers of 10 (for example, millimeter, centimeter, decimeter, etc.).

The new French Republic adopted the metric system in 1795, and within 100 years virtually all European nations—Great Britain and Ireland were, of course, the holdouts—had gone metric.

The American Debate

The metric question was first given serious consideration by Congress in 1821. Secretary of State John Quincy Adams was asked to prepare a report on weights, measures and coinage for Congress, which believed that it had the power to fix a system of weights and measures for the Republic. Adams favored many features of the metric system: its invariable standard of length taken from nature, the decimal basis, the precise and logical terminology, the relationship of the units to French coinage. More important, he perceived the need for international uniformity in weights and measures, whatever the system, to foster exchange among nations. Congress accepted Adams' report but rejected the metric system as "hazardous to deviate from the practice of Great Britain."

By 1850 Congress endorsed, and the states eagerly accepted, the Treasury secretary's recommendation to adopt the customary (inch-pound) system as the nation's official language of weights and measures. Over the years some units of the American system were modified, so that such measures as the pint, quart, gallon and ton have different values from their counterparts in the United Kingdom.

During the Civil War the metric system again came under scrutiny by the federal government. The National Academy of Sciences, formed by President Lincoln to advise the government on all technical matters, was asked by the Treasury secretary to appoint a committee to investigate the status of standards for weights, measures and coinage. Joseph Henry, the first secretary of the Smithsonian Institution and an eminent physicist, would direct the two-year study. The committee concluded its work in 1865 with the recommendation that the United States adopt the metric system, and the recommendation was taken up by Rep. John Kasson of Iowa. Kasson's legislation, the Act of July 28, 1866, legalized use of the metric system in America, but also specified the English system of equivalents. In other words, the act permitted but did not encourage metric usage.

The government endorsed the metric system a second time, in 1875, as one of 17 nations to sign the Treaty of the Meter, which reformulated the metric system and redefined the standards for length and mass. The treaty also established the International Bureau of Weights and Measures as the world repository and laboratory for the metric system. A few years after the new metric measurements were completed in 1889, the Treasury secretary announced by administrative order that the new standards would be the nation's "fundamental standards" of length and mass. The United States thus became a metric

Museums and Metric Education

Like other sectors, museums will have to develop plans and timetables to convert their operations to SI. Fortunately, personnel in some museums—particularly registration, conservation and curatorial departments—already are using some components of the metric system; but in most cases only one department or work area of the museum (for example, registration) uses the metric system while other departments plan exhibitions, write catalogs, conduct research and educate the public according to the customary system of units.

It behooves museums to be among the first institutions to convert to SI, because museums interact with their communities and are involved with public education. Each museum staff will have to determine whether it is to play a role in the metric education of the community or of a particular sector, and how SI can be integrated into permanent galleries, temporary exhibitions, adult education programs and children's classes, tours and improvisational workshops, interpretive materials such as labels and publications.

What do you know about public education programs and conversion plans that are being established in your area or across the country? What can your museum do to help the public think in metric terms?

State and Local Education

All 50 states have initiated metric education programs within their departments of education. Many have begun by providing basic instruction for elementary and secondary school teachers, but some states have already introduced the metric system into the curriculum. All schools in California were expected to begin teaching this year with the metric system.

State and local education agencies should be contacted to find out what metric education programs are being planned or are already underway, and how your institution can work cooperatively with schools (for example, school-group tours of the museum) in promoting metric education.

The U.S. Office of Education received $2 million in appropriations last September to begin metric education programs. These funds are available, as grants, to schools of higher learning, state and local education agencies and to nonprofit organizations for school-based interdisciplinary projects, teacher development, cooperative metric education planning, and national metric educational support. For guidelines and information contact: Special Projects Office, U.S. Office of Education, HEW, Washington, D.C. 20202.

USOE is also laying plans to establish a clearinghouse of SI information to coordinate the activities of the education community.

Information and Bulletins

Efforts by industry, labor and small business to establish plans for metric conversion are already underway. To find out what these sectors are doing in your community or state, contact the local or national Chamber of Commerce (the latter is in Washington, D.C.). Several federal government agencies and nonprofit organizations have established information clearinghouses on employee metric education, conversion plans and educational materials available. Contact the public information offices of these agencies to be placed on the mailing list for all metric information.

American National Metric Council
1625 Massachusetts Avenue, NW
Washington, D.C. 20036
(nonprofit, serves business, labor and educational interests)

Department of Commerce
Public Information Office
Washington, D.C. 20230

Department of Labor
200 Constitution Ave.
Washington, D.C. 20210

National Bureau of Standards
Washington, D.C. 20234

What Museums are Doing

Exhibitions about the metric system, labels in customary and metric units of measurement, permanent museum exhibits using the metric system, education programs for the public are among the metric education efforts that museums have begun. Here is a sampling:

- The first phase of permanent exhibits at the Memphis Pink Palace Museum (the new building opens in January, 1977) will include the metric system. An introductory display area of the new museum will compare the metric system to customary units.
- The National Zoo in Washington, D.C. and the Milwaukee Public Museum are introducing dual labels (in customary and metric units) in their exhibition areas. Milwaukee also teaches the principles of the metric system in a summer education program for youngsters called Touch-me-do.
- All directional signs at the Nature Science Park in Winston-Salem, N.C., are now in kilometers.
- Two traveling exhibitions are being circulated by the Association of Science-Technology Centers and the Smithsonian Institution Traveling Exhibitions Service, both in Washington, D.C. *Think Metric*, circulated by ASTC, is an exhibit in which visitors participate in games and measurement activities using the metric system. It is sponsored by the National Bureau of Standards. SITES is circulating *Australia Goes Metric*, which explains the history of measurement, the history of the metric system and how metrication is being achieved in Australia. *Think Metric* (1,200 square feet) is available for $150-$200 for a four-week period. *Australia Goes Metric* (140 m^2 or 1,500 square feet) rents for $400.

nation, and our customary units were redefined as cumbersome fractions of standard metric units.

U.S. interest in the metric system was revived in 1960 when the General Conference of Weights and Measures adopted the International System of Units, the modernized metric system (acronymically, SI, for Le Système International d'Unités). SI established a coherent system of units for the first time in modern history, but it also required nations using the metric system to phase out some traditional units for the new SI units. Britain responded in 1965 by announcing that it would begin the changeover to SI, and South Africa, Australia and Canada followed suit. This left Liberia, Yemen, Burma, Brunei and the United States as the only nonmetric countries.

The Winds of Change

The absence of a national metric policy did little to dissuade more farsighted American business and defense interests from adopting plans for conversion: The U.S. Army in 1957 for weapons and equipment; NASA in 1970; the pharmaceuticals industry; and American multinational interests, which recognized that SI established a common language for international communications and technology transfer. Britain's decision to metricate was influential in creating a more favorable climate of opinion for American conversion, but the real impetus came from those businesses, here and abroad, buying and selling raw materials and American products.

In response to these developments, Congress authorized and funded in 1968 a three-year U.S. Metric Study to be carried out by the Department of Commerce. Hundreds of representatives from industry, labor, retail organizations, professional societies, education and other sectors were invited to testify on the advisability and effects of adopting SI. These findings, as well as surveys of American manufacturers and other groups, were distilled and published in *A Metric America*, the 1971 metric study report.

The report was wholly favorable to conversion, calling it "a decision whose time has come." And American manufacturers—over 70 percent of those surveyed—were in favor too. Adopting the metric system would substantially affect our relations with the rest of the world, the report concluded, and would fortify the United States' position in technology development, trade and the setting of international product standards—the three areas primarily assessed in the study.

A Metric America neatly laid out the benefits that we could expect from becoming a metric nation:
▲ facilitating the import, export and sale of raw materials and manufactured products;
▲ improving American multinational interests—corporations that assemble complex products with components from different countries;
▲ strengthening American defense capability with our allies by expediting the repair of equipment, simplifying procurement across national boundaries and increasing communication of all data;
▲ insuring full U.S. participation in international standards-setting activities, which are increasingly based on SI, and, which, if unfavorable to American products, could be nontariff barriers for the export of American products;
▲ facilitating technology exchange between the United States and other countries;
▲ stimulating the American economy by creating new jobs and by corporate investment in new plant equipment and tools;
▲ strengthening the American education system by teaching an internally used system of measurement.

The Metric Study Board was also mindful of the objections to conversion expressed by industry, labor, small business and consumer groups: the costs of modifying or replacing plant equipment, tools, textbooks and manuals, and measurement devices used in business, the classroom and the home; the costs of educating the nation's work force and consumers to think metric; the possibility of engineering-design errors and loss of productivity during early phases of conversion; the confusion of using a dual system (customary and SI) even for a short period of time during conversion. Without massive government aid and tax incentives, the board concluded, a national conversion program would have to be on a voluntary basis.

The legislators who drafted the final metric legislation carefully reviewed and, for the most part, adopted the U.S. Metric Study recommendations:

▲ Costs will lie where they fall. Replacement of equipment and tools, employee education, etc., will be treated as normal business expenses.
▲ Conversion will be voluntary. However, a 17-member Metric Conversion Board—broadly representative of all interests—will work with the various sectors to help plan and monitor the increased use of the metric system.
▲ Detailed plans and timetables for conversion will be initiated and carried out by the various sectors. Nongovernmental initiatives insure that conversion will be voluntary and according to the rule of reason. There is no absolute timetable for full conversion, but many manufacturers are planning metrication activities for a 10-year period, at the end of which they will be predominantly metric.
▲ Congress will encourage full U.S. participation in international standards-setting activities, with the advice of the Metric Board.
▲ The Metric Board will assist, by helping to plan a broad program of public information and education, in making the public familiar with the meaning and application of metric terms and measures in daily life.

Many corporations, small businesses and labor groups have expressed serious reservations about metrication, particularly in light of the problems Britain has had in making the changeover. And yet there is ample evidence that industry is making plans to become metric. The automotive industry, a pillar of the American economy, steadfastly refused to consider metrication, but by 1973 General Motors, with its global operations, announced plans to design all new

(continued on page 72)

In Praise of Technology

Samuel C. Florman

A generation ago most people believed, without doubt or qualification, in the beneficial effects of technological progress. Books were written hailing the coming of an age in which machines would do all the onerous work, and life would become increasingly utopian.

Today there is a growing belief that technology has escaped from human control and is making our lives intolerable. Thus do we dart from one false myth to another, ever impressed by glib and simple-minded prophets.

Hostility to technology has become such a familiar staple of our reading fare that rarely do we stop to consider how this new doctrine has so quickly and firmly gained its hold upon us. I believe that critical scrutiny of this strange and dangerous phenomenon is very much overdue.

The founding father of the contemporary antitechnological movement is Jacques Ellul, a theological philosopher whose book, *The Technological Society,* was published in France in 1954, and in the United States 10 years later. When it appeared here, Thomas Merton, writing in *Commonweal,* called it "one of the most important books of this mid-century." In *Book Week* it was labeled "an essay that will likely rank among the most important, as well as tragic, of our time."

Ellul's thesis is that "technique" has become a Frankenstein monster that cannot be controlled. By technique he means not just the use of machines, but all deliberate and rational behavior, all efficiency and organization. Man created technique in prehistoric times out of sheer necessity, but then the *bourgeoisie* developed it in order to make money, and the masses were converted because of their interest in comfort. The search for efficiency has become an end in itself, dominating man and destroying the quality of his life.

The second prominent figure to unfurl the banner of antitechnology was Lewis Mumford. His conversion was particularly significant since for many years he had been known and respected as the leading historian of technology. His massive *Myth of the Machine* appeared in 1967 (Part I: *Technics and Human Development*) and in 1970 (Part II: *The Pentagon of Power*). Each volume in turn was given front-page coverage in *The New York Times Sunday Book Review.*

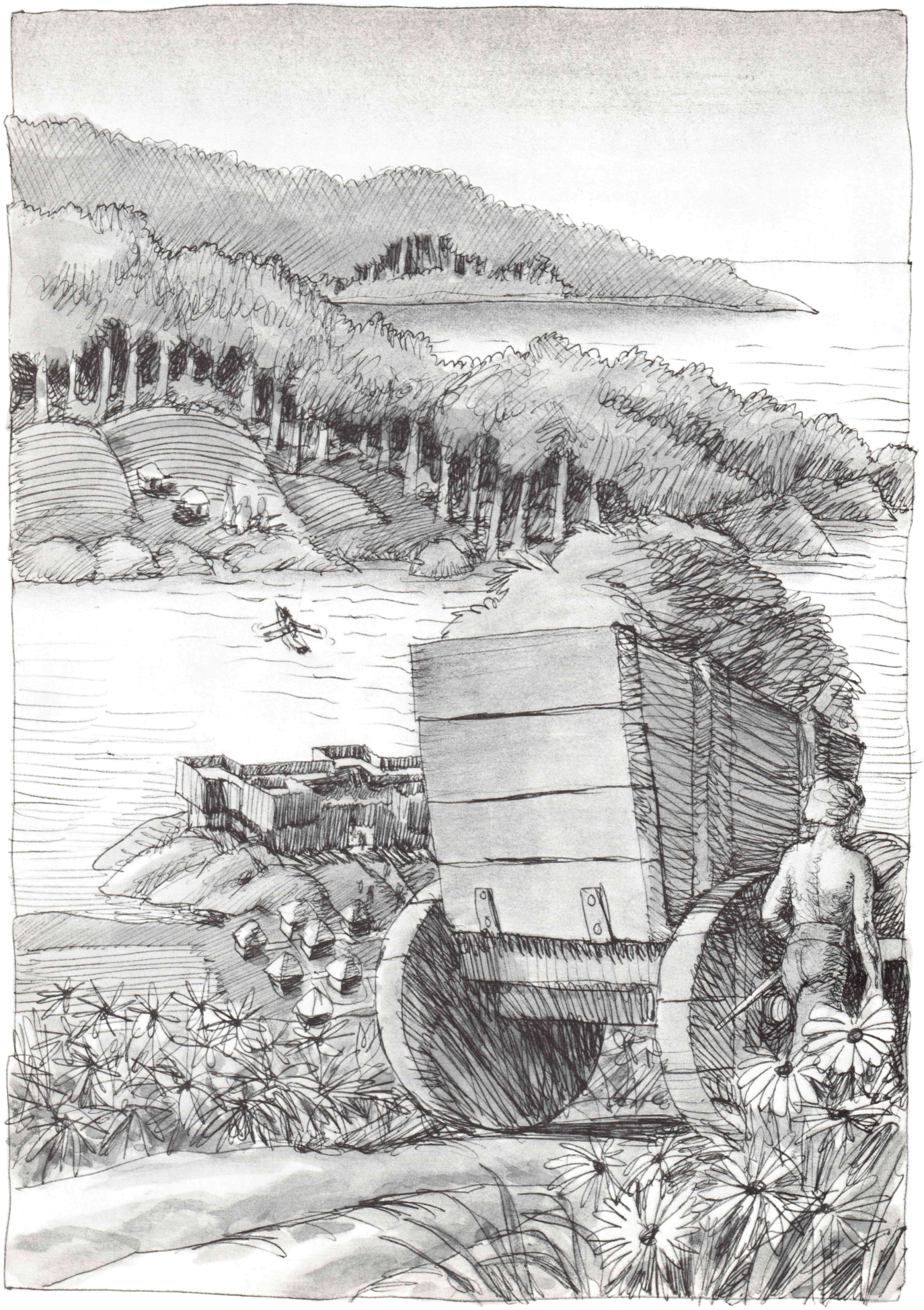
Samuel C. Florman, *an engineer, is co-owner of Kreisler Borg Florman Construction Company, Scarsdale, New York. In addition to* The Existential Pleasures of Engineering, *from which this article was excerpted (St. Martin's Press), he is the author of* Engineering and the Liberal Arts *and many articles dealing with the relationship of technology to the general culture.*

On the first page of *Book World* a reviewer wrote, "Hereafter it will be difficult indeed to take seriously any discussion of our industrial ills which does not draw heavily upon this wise and mighty work." The reviewer was Theodore Roszak, who, as we shall see, was soon to take his place in the movement.

The next important convert was René Dubos, a respected research biologist and author. In *So Human an Animal,* published in 1968, Dubos started with the biologist's view that man is an animal whose basic nature was formed during the course of his evolution, both physical and social. This basic nature, molded in forests and fields, is not suited to life in a technological world. Man's ability to adapt to almost any environment has been his downfall, and little by little he has accommodated himself to the physical and psychic horrors of modern life. Man must choose a different path, said Dubos, or he is doomed. This concern for the individual, living human being was just what was needed to flesh out the abstract theories of Ellul and the historical analyses of Mumford. *So Human an Animal* was awarded the Pulitzer Prize, and quickly became an important article of faith in the antitechnology crusade.

In 1970 everybody was talking about Charles A. Reich's *Greening of America.* In paperback it sold more than a million copies within a year. Reich, a law professor at Yale, spoke out on behalf of the youthful counterculture and its dedication to a liberating consciousness raising. Theodore Roszak's *Where the Wasteland Ends* appeared in 1972 and carried Reich's theme just a little further, into the realm of primitive spiritualism. Roszak, like Reich, is a college professor. Unlike *The Greening of America,* his work did not capture a mass audience. But it seemed to bring to a logical climax the antitechnological movement started by Ellul. As the reviewer in *Time* magazine said, "he has brilliantly summed up once and for all the New Arcadian criticism of what he calls 'postindustrial society.' "

There have been many other contributors to the antitechnological



movement, but I think that these five—Ellul, Mumford, Dubos, Reich and Roszak—have been pivotal. They make an unlikely combination: a theological philosopher, a historian of technology, a biologist and two academic apologists for the counterculture. However, they are united in their hatred and fear of technology, and surprisingly unanimous in their treatment of several key themes.

A primary characteristic of the antitechnologists is the way in which they refer to "technology" as a thing, or at least a force, as if it had an existence of its own. In this they take their cue from Ellul. "Technique has become autonomous," he writes. "It has fashioned an omnivorous world which obeys its own laws. . . ." This is not just a figure of speech; it is a serious definition. Repeatedly Ellul emphasizes that "technique pursues its own course more and more independently of man." Mumford speaks in the same vein:

> Not merely does technology claim priority in human affairs: it places the demand for constant technological change above any considerations of its own efficiency, its own continuity, or even, ironically enough, its own capacity to survive.

Dubos refers to an uncontrolled force which he labels "undisciplined technology." Reich is given to personifying technology in such statements as: "Technology has its own reasons for removing things from the culture. . . ," ". . . technology will dictate to man. . . ," "technology and the market have made our choices for us. . . ." He does not shrink from saying that affection, music, dance, work and religion "have been ravished by an expanding technology," a technology which he fears is becoming "an unthinking monster." Roszak is no less dramatic. He fears "the treachery of technology," and warns that technology "threatens to murder the flora and fauna of whole oceans."

Making due allowance for poetic license, it is clear in these repeated personifications that technology is considered to have an existence separate and distinct from individual human beings. Indeed, technology is thought of as something that, unless fought against, can *do things to* human society, such things as "claim priority," "take over" and "dictate," even "ravish" and "murder." This way of thinking has spilled over into common usage, so we are not surprised to see an advertisement that begins, "Technology has trapped us . . . ," or an article in a news magazine that says, "Technology is seen as a dangerous ally."

Having established the view of technology as an evil force, the antitechnologists then proceed to depict the average citizen as a helpless slave, driven by this force to perform work he detests. This work, according to Ellul, is "an aimless, useless, and callous business, tied to a clock, an absurdity profoundly felt and resented by the worker. . . ." For best results the worker "must be rendered completely unconscious and mechanized in such a way that he cannot even dream of asserting himself."

Moons and Murderous Highways

In the bleak world view of the antitechnologists, after the average person has been driven by evil forces to perform work he abhors, he is driven by forces no less malevolent to *consume* things he does not want. It is a central dogma of antitechnology that the consumer buys, not what he truly needs or desires, but rather those products which the technological society happens to spew forth.

Again it is Ellul who shows the way: "If man does not already have certain needs they must be created. The important concern is not the psychic and mental structure of the human being but the uninterrupted flow of any and all goods which invention allows the economy to produce." Mumford speaks mournfully of the "expanding body of consumers, sedulously conditioned by advertising and 'education' to ask only for those mass products that can be profitably supplied."

Dubos lists among the "special needs" created by our society such things as "a different dress for every day at the office, a playroom in the cellar, and a huge lampshade in front of the picture window." Reich echoes the theme: "The machinery turns out what it pleases and forces people to buy." As Roszak sees it, our "habits of consumption" are controlled by the big corporations who, in turn, are the agents of "the suave technocracy."

At the same time that they identify an anonymous technology as the source of these evils (and apparently oblivious to any inconsistency) the antitechnologists place the blame on a particular group of individuals: the Establishment. Strong, selfish men, making use of technology for their own benefit, supposedly force the masses of men to work and consume under conditions that can only be described as subhuman. According to antitechnological doctrine, the leaders of the Establishment are assisted in their nefarious work by a staff of deputies: the technologists. Sometimes, by a strange alchemy, the technologists themselves become the Establishment—called technocrats—using their esoteric knowledge to dominate their bewildered fellow citizens. This state of affairs, say the antitechnologists, tends not only to debase the quality of life, but to perpetuate itself in a form of technocratic totalitarianism.

Mumford speaks of the "directors of the power complex—the military, bureaucratic, industrial and scientific elite," who through publicity and prestige "are inflated to more than human dimensions in order better to maintain authority."

Dubos, a mild and humanistic commentator, by far the least rancorous of the five we are considering, is loath to accuse the Establishment of villainous intent. But he cannot resist making an attack on the technical elite:

> So far, we have followed technologists wherever their techniques have taken them, on murderous highways or toward the moon, under the threat of nuclear bombs or of supersonic booms. But this does not mean that we shall continue forever on this mindless and suicidal course.

Roszak turns to this theme again and again, each time in more anguished tones:

> The technocracy . . . is a citadel of expertise dominating the high

> ground of urban-industrial society, exercising control over a social system that is utterly beholden to technician and scientist for its survival and prosperity. . . .

Another atrocity of which technology is accused is cutting man off from the natural world in which he evolved. "Man was created," says Ellul, "to have room to move about in, to gaze into far distances, to live in rooms which, even when they were tiny, opened out on fields. See him now . . . in a twelve-by-twelve closet opening out on an anonymous world of city streets." Mumford avers that "a day such as millions spend in factories, in offices, on the highway, is a day empty of organic content and human rewards." This could have disastrous results, as he sees it, since the human species came into being amidst the abundant variety of the natural world, and if contact with that natural world is not maintained, "then man himself will become . . . denatured, that is to say, dehumanized."

Reich mourns the disappearance from our lives of such vital experiences as "living in harmony with nature, on a farm, or by a sea, or near a lake or meadow, knowing, using, and returning the elements." Roszak is concerned that "the whole force of urban industrialism upon our tastes is to convince us that artificiality is not only inevitable, but better—perhaps finally to shut the real and original out of our awareness entirely."

This subject seems to cause the antitechnologists particular distress. Dubos and Reich compare modern man to a wild animal spending its life in a city zoo. The architecture of modern cities they find "blankly uniform" (Mumford), "lifeless and gleamingly sterile" (Roszak). As for the attempts of city dwellers to make some small contact with nature, Ellul scorns "a crowd of brainless conformists camping out," while Dubos refers to the "pathetic weekend in the country."

Not only weekend outings, but all of modern man's leisure activities, are subjected to the most critical scrutiny by the antitechnologists. Predictably, they view these activities with pity and contempt. Television, according to Ellul, is enjoyed because man seeks "a total obliviousness of himself and his problems, and the simultaneous fusion of his consciousness with an omnipresent technical diversion." Are spectator sports popular with the average citizen? Mumford tells us that they are "watched by thousands of overfed and underexercised spectators whose only way of taking active part in the game is to assault the umpire." As for such innocuous amusements as a pinball game and a jukebox, Mumford labels them "disreputable" because they do not "promote human welfare, in the fullest sense." Does the common man enjoy riding in his automobile? Dubos tells us it "represents our flight from the responsibility of developing creative associations with our environment."

Reich speaks of the "pathos" of an old-fashioned ice cream parlor where families amuse themselves "amid a sterile model of the past." He tells of a young couple who ski, play tennis and sail, but only think they enjoy these pastimes, when they are really playing out roles copied from the mass media. Roszak is irritated by people "devouring hot dogs and swilling soft drinks" while waiting to see Old Faithful erupt. He observes with disgust that "their eyes vanished behind their cameras" and that one young boy said, "Disneyland is better."

These, then, are the main themes that run through the works of the antitechnologists:

(1) Technology is a "thing" or a force that has escaped from human control and is spoiling our lives.

(2) Technology forces man to do work that is tedious and degrading.

(3) Technology forces man to consume things that he does not really desire.

(4) Technology creates an elite class of technocrats, and so disenfranchises the masses.

(5) Technology cripples man by cutting him off from the natural world in which he evolved.

(6) Technology provides man with technical diversions which destroy his existential sense of his own being.

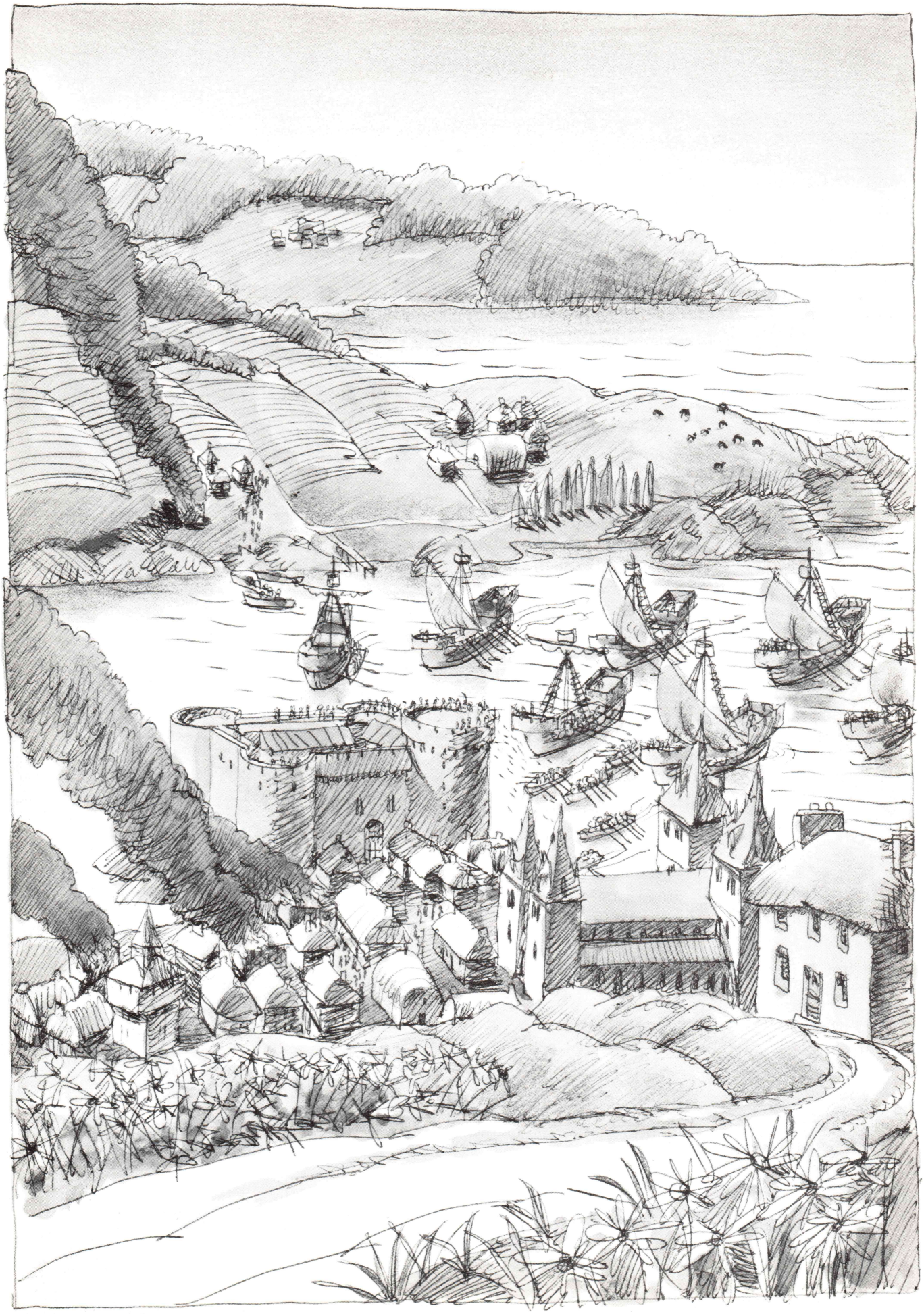
Lost Harmonies

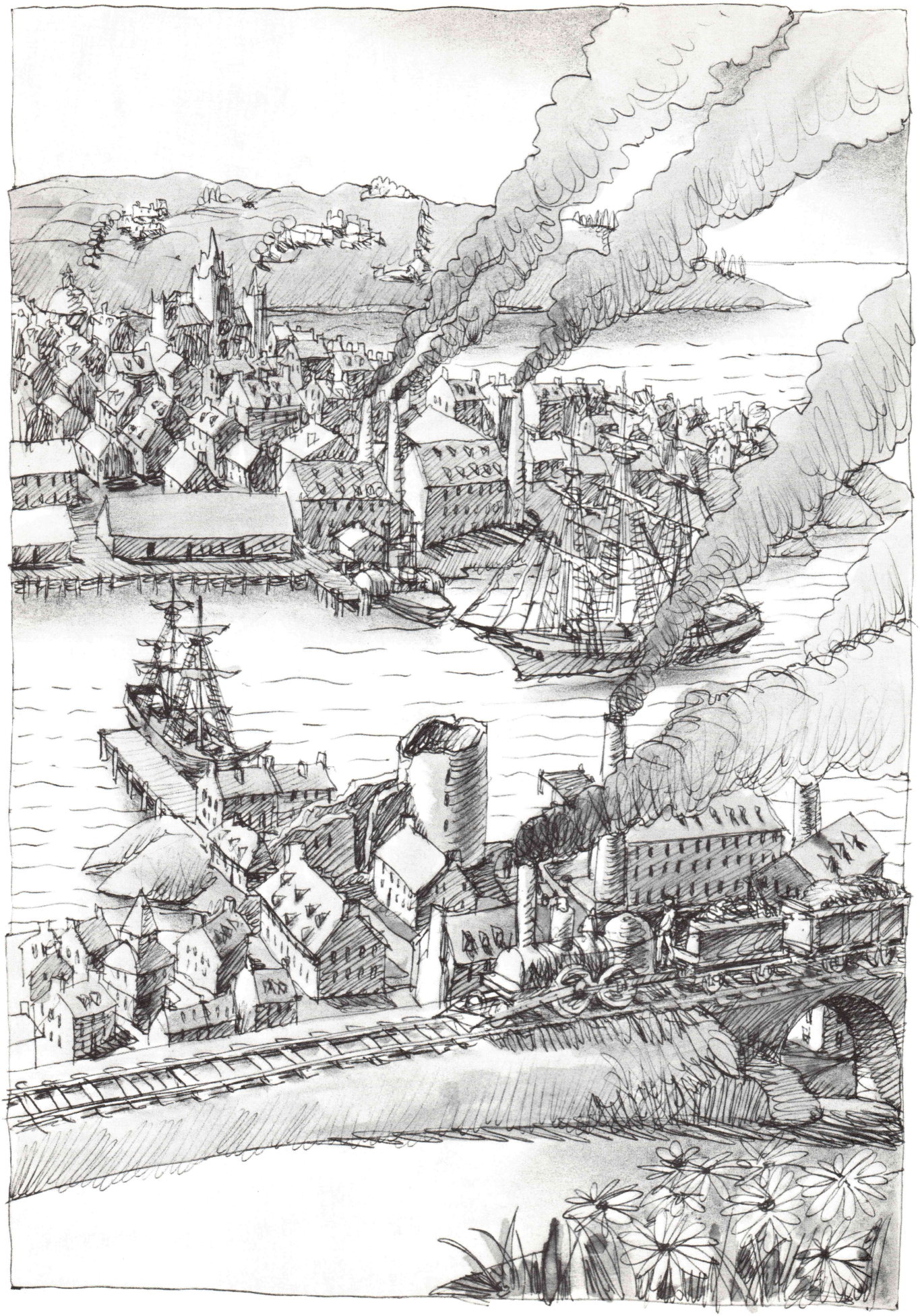
The antitechnologists repeatedly contrast our abysmal technocracy with three cultures that they consider preferable: the primitive tribe, the peasant community and medieval society.

Ellul notes approvingly that primitive man "worked as little as possible and was content with a restricted consumption of goods. . . . The time given to the use of techniques was short, compared with the leisure time devoted to sleep, conversation, games, or, best of all, to meditation." Mumford declares that the agricultural work of neolithic times "brought the outer and inner life into harmony." Dubos reflects sadly on how the Northwestern coastal Indians, who used to have lengthy periods of leisure, "do not find the time to carve and to paint now that they have accepted the efficient ways of technological civilization." Reich believes that early man "built his life around the rhythms of the earth and his mental stability upon the constancies of nature," a theme echoed by Roszak who maintains that primitive tribes lived in close company with the earth, "striving to harmonize the things and thoughts of their own making with its nonhuman forces."

As for the peasant, Ellul tells us that he "interrupts his workday with innumerable pauses. He chooses his own tempo and rhythm. He converses and cracks jokes with every passerby." Mumford contends that "the poorest peasant . . . is foot-free and mobile," while Dubos feels that "our ancestors' lives were sustained by physical work and direct associations with human beings"—this being in contrast to "our absurd way of life." Reich is pleased to report that "the oldtime peasant had very real capacity for a non-material existence," and Roszak laments the eventual passing of "self-determining rural life."

Fond as they are of tribal and peasant life, the antitechnologists become positively euphoric over the





Middle Ages. Medieval society, according to Ellul, "was vital, coherent and unanimous," and opposed technical development with "the moral judgment which Christians passed on all human activities." Mumford rhapsodizes over "The Medieval Equilibrium" in which "a nice balance was established between the rural and the urban, between the organic and the mechanical, between the static and the dynamic components." Dubos is impressed by the fact that during the Middle Ages "Christianity acted as a great unifying force by giving the people of Europe a few common aspirations and social disciplines derived from the love and fear of God." According to Reich, in medieval times, "when a very different consciousness prevailed, neither technology nor the market was permitted to dominate other social values. . . ." Roszak finds in medieval alchemy one of the last precious examples of the "magical worldview," the disappearance of which he deplores.

Recognizing that we cannot return to earlier times, the antitechnologists nevertheless would have us attempt to recapture the satisfaction of these vanished cultures. In order to do this, what is required is nothing less than *a change in the nature of man.* The antitechnologists would probably argue that the change they seek is really a return to man's *true* nature. But a change from man's present nature is clearly their fondest hope.

Ellul is pessimistic, implying that intervention by God might be required. But the other four are more sanguine. According to Mumford, the growth of technology has "produced alterations in the human personality" and "modified . . . man's internal character." He feels that it is essential to reverse the process, and that it is still not too late to do so. To this end he proposes that we study closely the creature that is man. "We must understand the organics and physics of personality as we first understood the statics and mechanics of physical processes."

Dubos concurs, and calls for the development of a "science of humanity" so that we can have "a better knowledge of what human beings require biologically, what they desire culturally, and what they hope to become." With this "new kind of knowledge," we could then proceed to provide environments that would "encourage the expression of desirable human potentialities." Reich looks forward to "that 'change in human nature' which has been sought so long" and discerns the coming of a "new consciousness." Roszak also speaks of "reshaping the consciousness of people." All agree that a necessary first step toward the reshaping of human nature is a disavowal of the goals of technology, or rather an exorcism of technology from the soul of man.

Although the antitechnologists are concerned mainly with the harmful *effects* of technology, they reserve some of their disdain for the *activity* itself, and for men who make it their life's work. As seen by the antitechnologists, engineers and scientists are half-men whose analysis and manipulation of the world deprives them of the emotional experiences that are the essence of the good life.

Ellul maintains that without the charts and motors that make them feel important, technologists "would find themselves poor, alone, naked and stripped of all pretensions." Mumford calls them "adepts in abstract thinking though often babies in terms of well-salted human experience," and suggests that the scientific way of thinking represents a neurotic inability to face life as a whole. Dubos, being a scientist himself, is less harsh in his judgment of his peers. But Reich and Roszak really let loose on this topic. According to Reich, the technologist is alienated from his true self and his true needs. He is uptight, lonely, inauthentic, unable to receive or give out sensual vibrations. He is not a real man. He is "a smoothed-down man." Roszak maintains that the scientist and the technologist, in their objectivity, are guilty of "single vision," and "seeing with a dead man's eyes."

Choose your Weapons

In the often-repeated story, Samuel Johnson and James Boswell stood talking about Berkeley's theory of the nonexistence of matter. Boswell observed that although he was satisfied that the theory was false, it was impossible to refute it. "I never shall forget," Boswell tells us, "the alacrity with which Johnson answered, striking his foot with mighty force against a large stone, till he rebounded from it—'I refute it *thus.*' "

The ideas of the antitechnologists arouse in me a mood of exasperation similar to Dr. Johnson's. Their ideas are so obviously false, and yet so persuasive and widely accepted, that I fear for the common sense of us all.

The impulse to refute this doctrine with a Johnsonian kick is diminished by the fear of appearing simplistic. So much has been written about technology by so many profound thinkers that the nonprofessional cannot help but be intimidated. Unfortunately for those who would dispute them, the antitechnologists are masters of prose and intellectual finesse. To make things worse, they display an esthetic and moral concern that makes the defender of technology appear like something of a philistine. To make things worse yet, many defenders of technology are indeed philistines of the first order.

Yet the effort must be made. If the antitechnological argument is allowed to stand, the engineer is hard pressed to justify his existence. More important, the implications for society, should antitechnology prevail, are most disquieting. For, at the very core of antitechnology, hidden under a veneer of esthetic sensibility and ethical concern, lies a yearning for a totalitarian society.

The first antitechnological dogma to be confronted is the treatment of technology as something that has escaped from human control. It is understandable that sometimes anxiety and frustration can make us feel this way. But sober thought reveals that technology is not an independent force, much less a thing, but merely one of the types of activities in which people engage. Furthermore, it is an activity in which people engage because they choose to do so. The choice may

sometimes be foolish or unconsidered. The choice may be forced upon some members of society by others. But this is very different fom the concept of technology *itself* misleading or enslaving the populace.

Philosopher Daniel Callahan has stated the case with calm clarity:

> At the very outset we have to do away with a false and misleading dualism, one which abstracts man on the one hand and technology on the other, as if the two were quite separate kinds of realities. I believe that there is no dualism inherent here. Man is by nature a technological animal; to be human is to be technological. If I am correct in that judgment, then there is no room for a dualism at all. Instead, we should recognize that when we speak of technology, this is another way of speaking about man himself in one of his manifestations.

Although to me Callahan's statement makes irrefutable good sense, and Ellul's concept of technology as being a thing-in-itself makes absolutely no sense, I recognize that this does not put an end to the matter, any more than Samuel Johnson settled the question of the nature of reality by kicking a stone.

It cannot be denied that, in the face of the excruciatingly complex problems with which we live, it seems ingenuous to say that men invent and manufacture things because they want to, or because others want them to and reward them accordingly. When men have engaged in technological activities, these activities appear to have had *consequences*, not only physical but also intellectual, psychological and cultural. Thus, it can be argued, technology is *deterministic*. It causes other things to happen. Someone invents the automobile, for example, and it changes the way people think as well as the way they act. It changes their living patterns, their values and their expectations in ways that were not anticipated when the automobile was first introduced. Some of the changes appear to be not only unanticipated but undesired. Nobody wanted traffic jams, accidents and pollution. Therefore, technological advance seems to be independent of human direction. Observers of the social scene become so chagrined and frustrated by this turn of events—and its thousand equivalents—that they turn away from the old common-sense explanations, and become entranced by the demonology of the antitechnologists.

Once mysterious "technology" is invoked as a deterministic force, it becomes no longer intellectually respectable to say that our automobile culture has grown because people have always wanted to do the things that automobiles now enable them to do. The desire to move quickly and independently from one place to another has existed within the human heart for a long time. Technologists, knowing of this desire, were, in a sense, "commissioned" to invent the automobile. Today it is clear that people enjoy the freedom of movement of which they had previously dreamed. True, they are unhappy about traffic jams, accidents and pollution, but they recognize that these unhappy developments result from human decisions, not from technological imperatives. With remarkable stubbornness, and contrary to technological good sense, people persist in drinking and driving recklessly, refuse to take commuter trains, even where good and speedy ones exist, and resist joining together in car pools, which could reduce traffic by more than half.

However much we deplore the growth of our automobile culture, clearly it has been created by people making choices, not by a runaway technology. Some people have come to despise the automobile, but at the present time they are very much in the minority. As more and more citizens become disgruntled with the problems arising out of mass ownership of the automobile, they are beginning to pass new laws controlling its use, and also to "commission" the technologists to devise different types of vehicles for individual and mass transport.

Of course, this is a superficial view of what has happened, but less superficial, I submit, than the antitechnological view, which sees a malignant technology "creating" choked and bloodied highways while the populace suffers in bewilderment.

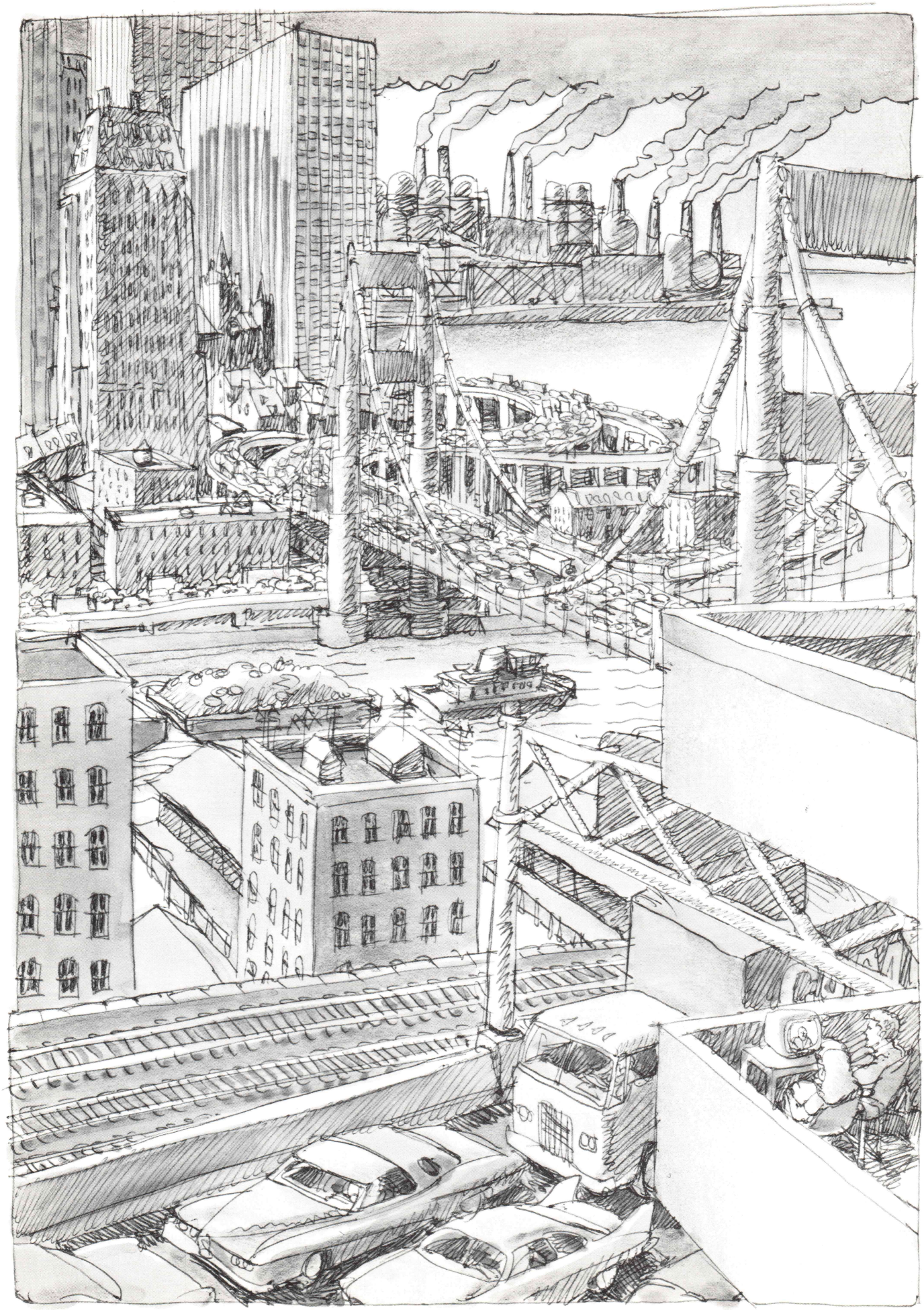
Four decades ago, long before he became depressed by the atom bomb and other unfortunate technological developments, Lewis Mumford saw things more rationally:

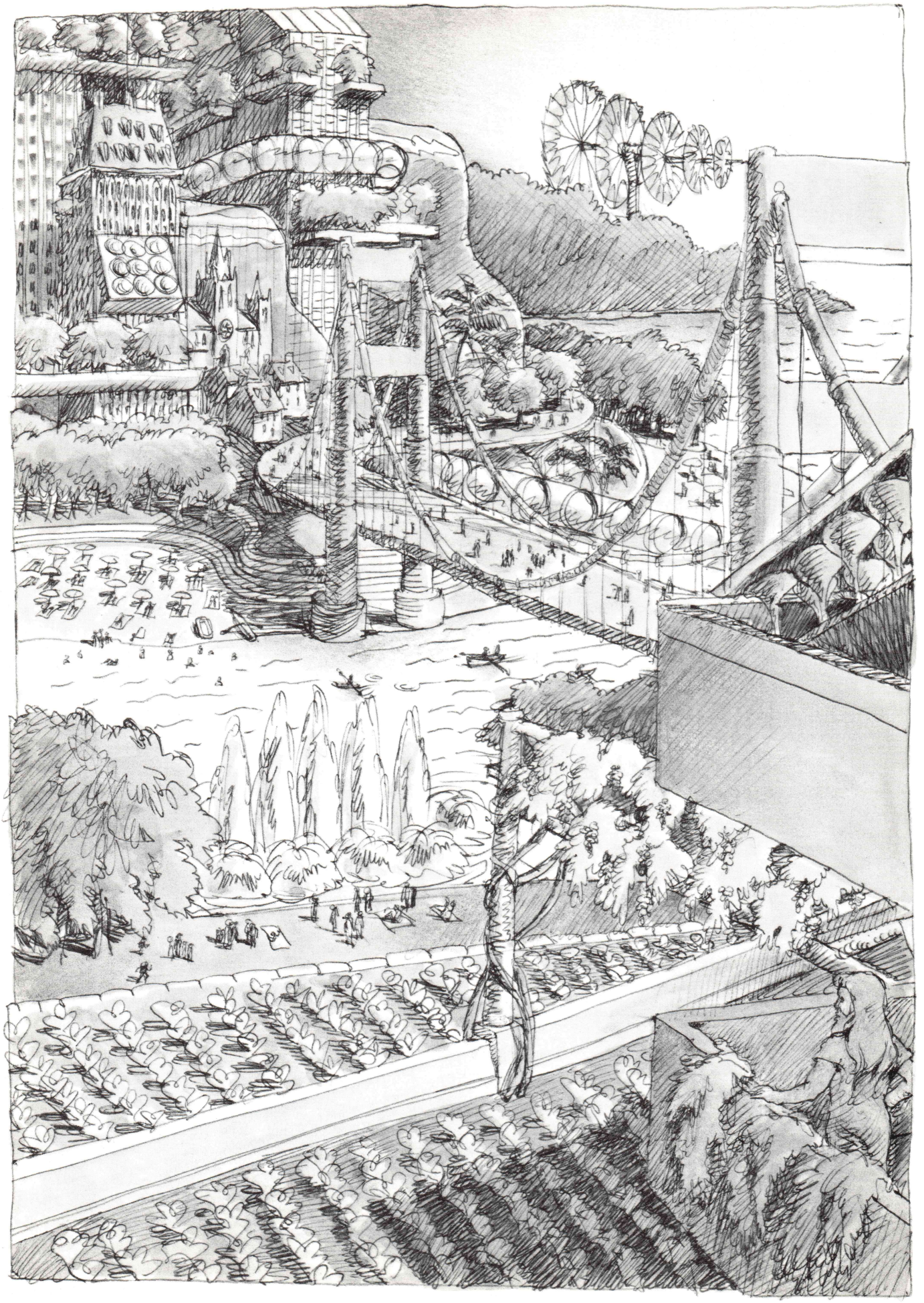
> Choice manifests itself in society in small increments and moment-to-moment decisions as well as in loud dramatic struggles; and he who does not see choice in the development of the machine merely betrays his incapacity to observe cumulative effects until they are bunched together so closely that they seem completely external and impersonal. . . . [T]echnics . . . does not form an independent system, like the universe: it exists as an element in human culture and it promises well or ill as the social groups that exploit it promise well or ill. The machine itself makes no demands and holds out no promises: it is the human spirit that makes demands and keeps promises.

In recent times, Mumford has seen fit to absolve the human spirit of any consequential sins. He and his fellow antitechnologists would have us believe that most of the unpleasant aspects of our life are caused, not by the human spirit, but by "technology"—a demon, a force, a thing-in-itself. This logical absurdity, which has been working its way into our popular consciousness, is the first antitechnological myth to be resisted.

In addition to confounding rational discourse, the demonology outlook of the antitechnologists discounts completely the integrity and intelligence of the ordinary person. Indeed, pity and disdain for the individual citizen is an essential aspect of antitechnology. It is central to the next two dogmas, which hold that technology forces man to do tedious and degrading work, and then forces him to consume things that he does not really desire.

Is it ingenuous, again, to say that people work, not to feed some monstrous technological machine, but, as since time immemorial, to feed themselves? We all have ambivalent feelings toward work, engineers as well as antitechnologists. We try to avoid it, and yet we seem to require it for our emotional well-being. This dichotomy is as old as civilization. A few wealthy people are bored because they are not required to work, and a lot of ordinary people grumble because they have to work hard.





The antitechnologists romanticize the work of earlier times in an attempt to make it seem more appealing than work in a technological age. But their idyllic descriptions of peasant life do not ring true. Agricultural work, for all its appeal to the intellectual in his armchair, is brutalizing in its demands. Factory and office work is not a bed of roses either. But given their choice, most people seem to prefer to escape from the drudgery of the farm. This fact fails to impress the antitechnologists, who prefer their sensibilities to the choices of real people.

As for the technological society forcing people to consume things that they do not want, how can we respond to this canard? Like the boy who said, "Look, the emperor has no clothes," one might observe that the consumers who buy cars and electric can openers could, if they chose, buy oboes and oil paints, sailboats and hiking boots, chess sets and Mozart records. Or, if they have no personal "increasing wants," in Mumford's phrase, could they not help purchase a kidney machine which would save their neighbor's life? If people are vulgar, foolish and selfish in their choice of purchases, is it not the worst sort of cop-out to blame this on "the economy," "society" or "the suave technocracy"? Indeed, would not a man prefer being called vulgar to being told he has no will with which to make choices of his own?

Illusive Elite

Which brings us to the next tenet of antitechnology, the belief that a technocratic elite is taking over control of society. Such a view at least avoids the logical absurdity of a demon technology compelling people to act against their own interests. It does not violate our common sense to be told that certain people are taking advantage of other people. But is it logical to claim that exploitation increases as a result of the growth of technology?

Upon reflection, this claim appears to be absolutely without foundation. When camel caravans traveled across the deserts, there were a few merchant entrepreneurs and many disenfranchised camel drivers. From earliest historical times, peasants have been abused and exploited by the nobility. Bankers, merchants, landowners, kings and assorted plunderers have had it good at the expense of the masses in practically every large social group that has ever been (not just in certain groups like pyramid-building Egypt, as Mumford contends). Perhaps in small tribes there was less exploitation than that which developed in large and complex cultures, and surely technology played a role in that transition. But since the dim, distant time of that initial transition, it simply is not true that advances in technology have been helpful to the Establishment in increasing its power over the masses.

In fact, the evidence is all the other way. In technologically advanced societies, there is more freedom for the average citizen than there was in earlier ages. There has been continuing apprehension that new technological achievements *might* make it possible for governments to tryannize the citizenry with Big Brother techniques. But, in spite of all the newest electronic gadgetry, governments are scarcely able to prevent the antisocial actions of criminals, much less control every act of every citizen. Hijacking, technically ingenious robberies, computer-aided embezzlements, and the like, are evidence that the outlaw is able to turn technology to his own advantage, often more adroitly than the government. The FBI has admitted that young revolutionaries are almost impossible to find once they go "underground." The rebellious individual is more than holding his own.

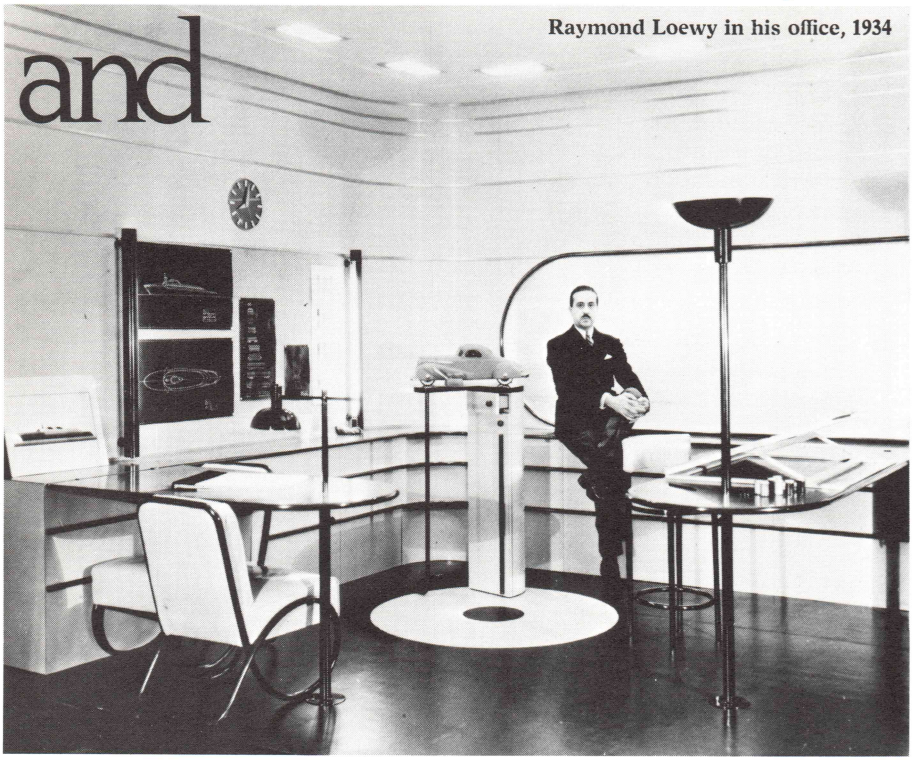
Exploitation continues to exist. That is a fact of life. But the antitechnologists are in error when they say that it has increased in extent or intensity because of technology. In spite of their extravagant statements, they cannot help but recognize that they are mistaken, statistically, at least. Reich is wrong when he says that "decisions are made by experts, specialists, and professionals safely insulated from the feelings of the people." (Witness changes in opinion, and then in legislation, concerning abortion, divorce and pornography.) Those who were slaves are now free. Those who were disenfranchised can now vote. Rigid class structures are giving way to frenetic mobility. The barons and abbots and merchant princes who treated their fellow humans like animals, and convinced them that they would get their reward in heaven, would be incredulous to hear the antitechnologists theorize about how technology has brought about an increase in exploitation. We need only look at the underdeveloped nations of our present era to see that exploitation is not proportionate to technological advance. If anything, the proportion is inverse.

As for the role of technologists in the Establishment, it is ironic to hear ourselves called "high priests" and "technocratic elite" at the very time that we are complaining of a lack of prestige and power. Talk to any engineer or scientist, look into any professional journal, and you will learn quickly enough that the centers of power lie elsewhere. Technologists are needed, to be sure, just as scribes were needed at one time, or blacksmiths, or millers, or builders of fortresses. Some engineers have moved into positions of responsibility in industry and government, but their numbers are small compared to leaders trained in the law, accounting and business. In any event, real power rests, not with the technologists, or with any special professional group for that matter, but with the wealthy, the clever and the daring —and with their friends—just as it always has. How blind must one be not to see this obvious truth?

Nor do the technologists lord it over their fellows from a "citadel of expertise." That this myth persists is difficult to comprehend, but it appears to have a special place in the hearts of antitechnologists. John McDermott, in 1969, wrote a piece for *The New York Review of Books* entitled "Technology: The Opiate of the Intellectuals." It received quite a bit of attention at the time, and has since become a standard point of reference in the anti-

(continued on page 46)

Raymond Loewy and Industrial Design



Raymond Loewy in his office, 1934

Lois Frieman Brand

The modern American landscape is dominated by mass-produced consumer goods, chain stores, fast-food franchises, gasoline stations and vehicles of every description. These symbols of society, which are variously perceived as innovative, vulgar or nondescript, are in the domain of the industrial designer.

The creators of these elements of modernization are not as familiar to the public as the objects themselves. But during the first half of this century, industrial designers have strongly influenced the visual and functional format of our environment. Raymond Loewy, a founder of and major contributor to this profession, has in the course of his 47-year career played a prominent role in changing the physical and conceptual elements of the modern world.

Today there is renewed interest in industrial design, but great confusion still surrounds the profession. To those who associate industry with all that is evil in society, it represents big business, pollution, a sham. The industrial designer may be seen only as an extension of this enemy of the consumer and may be associated exclusively with designs for factories and heavy industry. This description does not apply to Raymond Loewy or to the other independent industrial designers whose talents are devoted to product design and development, packaging, graphic and transportation design, and architectural interior and exterior design. Raymond Loewy has focused his efforts on all these areas, developing and adhering to standards of excellence in economy of form, function and cost, selection of materials, ease of maintenance and operation, and esthetics.

Loewy, who was born in Paris but became an American citizen in 1938, was influenced as a young man by the astounding events that were changing the course of civilization. By his 20th birthday, he had studied engineering, witnessed the invention and introduction of the electric light, the telephone, the automobile, the airplane, the cinema and the radio. He also had participated in one of the most shocking events of modern history, World War I. These occurrences, as well as the mid-19th century American industrial revolution, contributed to the development and application of the concepts that were to be known as industrial design.

Origins of Industrial Design

From colonial days to the middle of the 19th century, independent craftsmen dominated the design, production and distribution of household goods, vehicles and furniture in this country. The craftsman was proud of his product, and executed it with careful thought to its function and appearance, thereby setting the standards for American design.

With the advent of machine power and mass production, however, craftsmen left the factories and were forced out of business by large manufacturers. When craftsmen were eliminated from the production process, quality, integrity of design and individuality also vanished.

The era of industrialization nearly eradicated grace and beauty from the American environment. During the late 19th and early 20th centuries, many new mechanical conveniences were marketed with little concern for factors other than performance. Economy of function, quality of materials, integrity of design and ease of maintenance, all important considerations of the craftsmen, were neglected.

The novelty of the new mechanical devices appealed to consumers, whose overwhelming economic sup-

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Lois Frieman Brand *was coordinator of "The Designs of Raymond Loewy," an exhibition at the Renwick Gallery, Smithsonian Institution. She received a master's degree in art history and museum training from George Washington University and is associated with the New Haven Colony Historical Society.*

Lucky Strike package, introduced 1942

port encouraged manufacturers to turn out a great variety and quantity of the latest technological innovations. The prosperity of the late 1920s resulted in a seller's market, in which there was no need for the "hard sell" and therefore little interest on the part of manufacturers to increase their products' appeal. It was not until the consumer market approached saturation that manufacturers began to realize that modern products might offer more than function alone. With the advent of the Depression, American industrialists finally understood that industrial design was a necessary component of successful manufacturing.

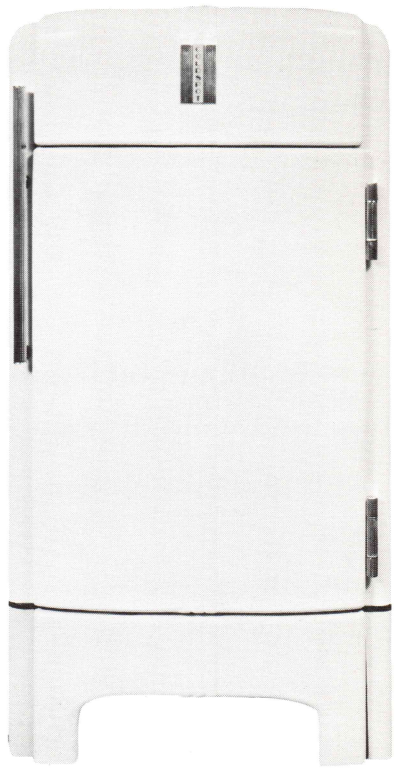
Raymond Loewy arrived in New York City in 1919, recently discharged from the French army, speaking no English and faced with the problem of earning a living. He capitalized on his drawing ability, working as a fashion illustrator for *Vogue* and *Harper's Bazaar*. Although his career seemed promising, Loewy was not satisfied, and turned to his knowledge of engineering. He recalls his early impressions of American industry:

> I had been shocked by the contrast between the superlative quality of most American manufactured products and their clumsy appearance. They were heavy, vulgar and noisy. They vibrated, shook and rattled. To me this was not expressing American industrial genius. It made no sense and I felt an irresistible urge to do something about it. I was esthetically shocked.[1]

Loewy's first opportunity to amend this imbalance between American technological expertise and the awkward appearance of American products came in 1929, when manufacturer Sigmund Gestetner offered Loewy a contract to redesign his duplicating machine. Faced with an unusually tight deadline of three days, Loewy approached the problem in an equally unusual manner. He created his new design by molding clay directly over the existing machine, which was a mass of exposed cogs, wheels and belts. The result, a protective shell covering the working parts, placed on a set of wooden drawers, was a great commercial success and remained in production virtually unchanged for over 40 years.

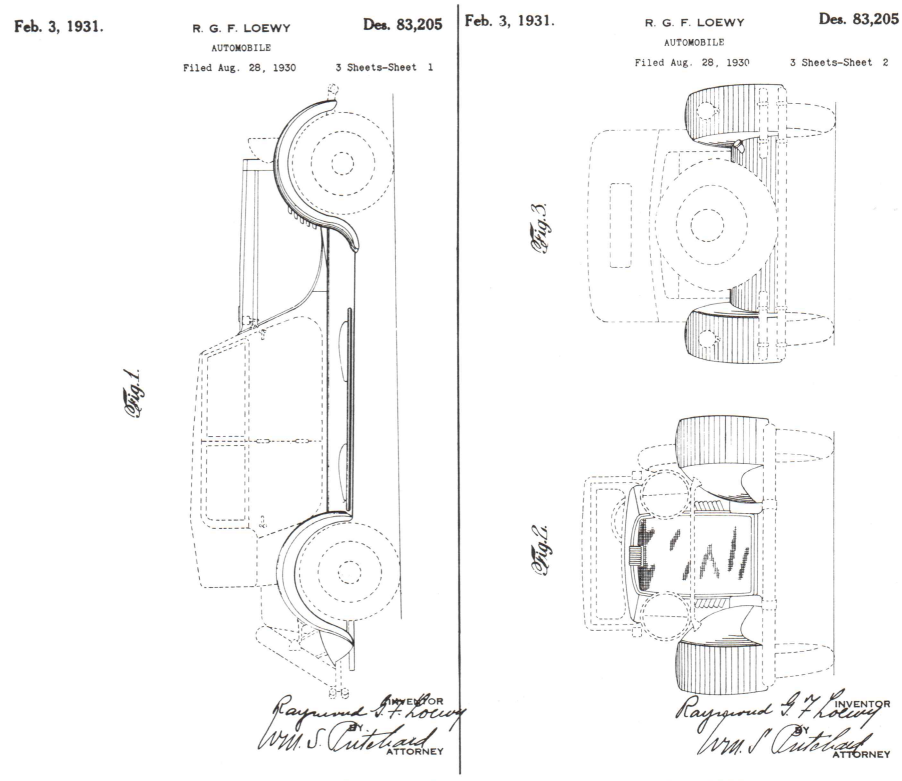
Everyday Machines

Throughout his career, Loewy continued to incorporate good design in everyday machines and appliances. His 1947 design for the Singer S-1 vacuum cleaner was a vast improvement over the previous model, which was unattractive and functionally inept. Its excessive weight and bulky construction made it inefficient, an insult to technological expertise. Loewy's redesigned S-1 had dual suction fans, a floating brush, disposable paper bag, hang-flat construction, a cord reel, a slimmer container and lighter weight than the previous model.



Sears & Roebuck Coldspot Super 6, 1935

Not all of Loewy's product designs have been as highly visible as the S-1 and the Gestetner duplicating machine. A pragmatic designer, he has used new technology in a wide range of products. For example, while involved with the automobile industry in the 1930s, Loewy met a



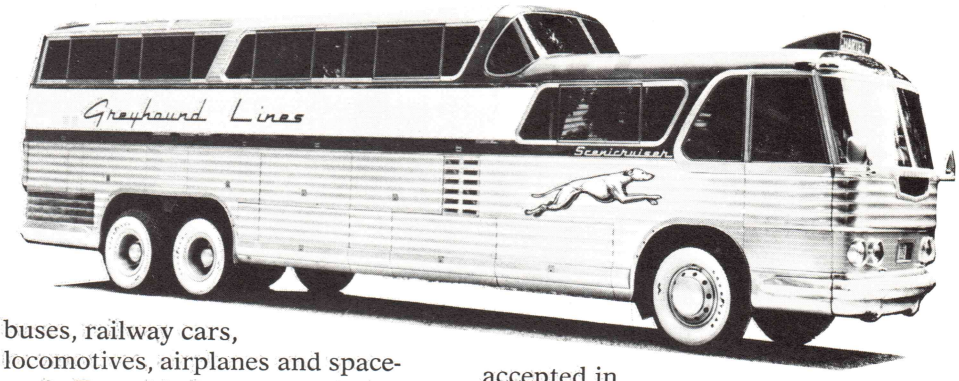
Loewy's patent drawing for an automobile, filed in 1930

manufacturer who had developed a method of producing aluminum stamped automobile grilles. At the time, Loewy also was working on designs for Coldspot refrigerators for Sears, Roebuck and Company, and realized the potential advantages of aluminum shelves. Refrigerator shelves previously had been made of iron; they rusted, were expensive to produce, and were cumbersome. By using aluminum shelves in the 1935 Coldspot Super 6, Loewy reduced production costs and provided consumers with a more durable product. This subtle design element was widely adopted, and American manufacturers were quick to note the improvement in their products.

Farsighted Transportation Design

Raymond Loewy consistently has excelled in transportation design. He has been an influential force in the design of automobiles, ferries, ocean liners, buses, railway cars, locomotives, airplanes and spacecraft. From his first patent design for an automobile in 1931 through his contributions to NASA's Skylab in the late 60s, Loewy has promoted the principles of aerodynamics, durability and engineering economy.

The Super Scenicruiser, designed for the Greyhound Corporation (1954)



Although Loewy has adhered consistently to high standards and fostered innovative concepts, he has not always been accepted in transportation manufacturing circles. He often recalls his first major confrontation, in the 1930s, with the conservatism of auto manufacturers. He was riding in a car with an executive from one of the major automobile producers, whom he was soliciting as a client. Loewy tried to convince his companion that cars should have a sleeker and lower design, for better handling and traction. The executive pointed to a bus which had driven alongside their car, and insisted that the American public would never purchase cars that were close to the ground, because the drivers would feel inferior to larger vehicles and to passengers in buses. Loewy thought this was an absurd notion, and it became his personal aim to see American cars reflect the standards he espoused.

Coca-Cola dispenser, 1948

In 1942 Loewy once again was thinking ahead of Detroit when he made these predictions for American automobiles: flush construction for windows, doors and fenders; air conditioning; smaller and more efficient engines; and general simplification of design for practical as well as esthetic reasons.[2] Loewy had hoped that these and other ideas would be used in postwar American automobiles. Nevertheless, many years passed, spanning his involvement with the Studebaker Corporation from the 40s through the 60s, before Loewy saw all these elements in one congruent design.

Many of the advances Loewy had predicted as early as 1942 were still making only a minor impression on the automobile industry when the

Loewy's Avanti II

Society of Automotive Engineers celebrated its 50th anniversary in 1955. Raymond Loewy was the only one of many speakers who focused on the future of the auto industry and on the concept of the compact car, which eventually would become very important to Detroit.

Consumer Protection

Loewy's innovative consumer product designs as well as his work in the automobile industry represent his desire to protect the consumer. Discussing the relationship of the industrial designer and the consumer, Loewy says:

> We try to defend the consumer. We are on a constant crusade for protection of the consumer. By this I mean we try to make sure that the price is right, that the function is respected.

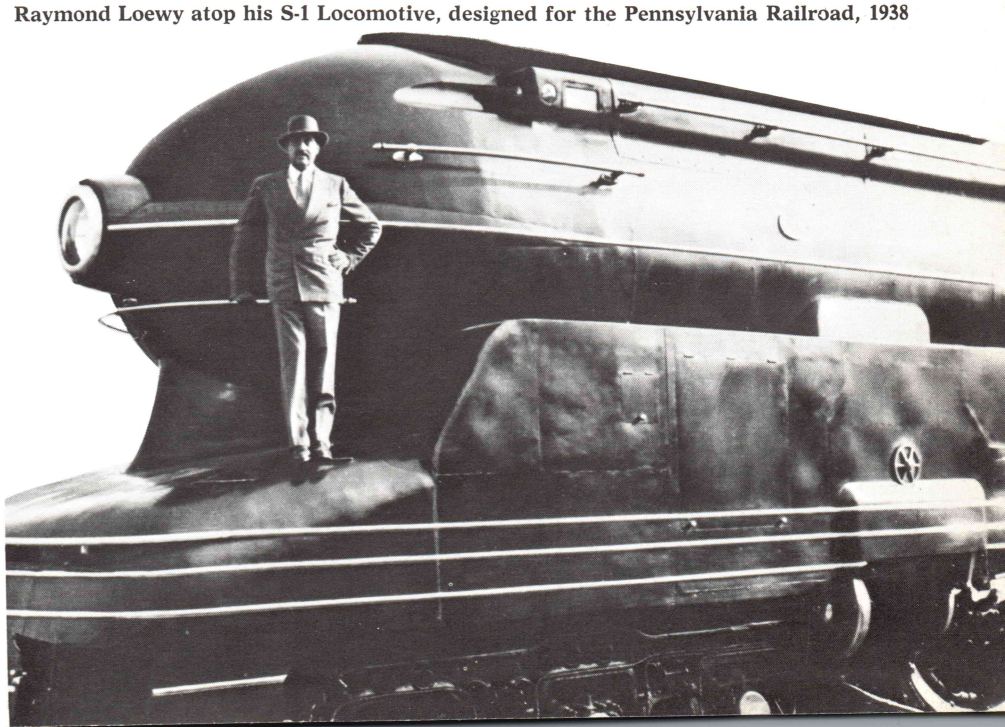
Yet despite Loewy's honorable intentions, he has only limited control over the application of his design to the finished product. An industrial designer, after all, is marketing a product. There are no assurances that the manufacturer will reproduce Loewy's work as it was originally intended. A manufacturer is free to produce any product he wishes, despite the original design submitted. Loewy says, however, that if a manufacturer produces one of his designs in a shoddy manner, he will refuse to work for that company again. Thus consumers who want to eliminate inferior products should not point an accusing finger at only the industrial designer, but must search for the responsible parties in all areas of our society.

Raymond Loewy and his industrial design firm have made innumerable contributions to the American landscape, both past and present. Their designs have become ingrained in our memories and their efforts appear astounding. However, for Loewy it is the past which is inconceivable and the future which must be conceived. △

Notes

1. The source for all quotations and descriptions of events is conversations with Raymond Loewy in 1974 and 1975.
2. "Designs of the Post War Motor Car, As Seen by Raymond Loewy," *Art and Industry*, November, 1942, p. 148.

Raymond Loewy atop his S-1 Locomotive, designed for the Pennsylvania Railroad, 1938



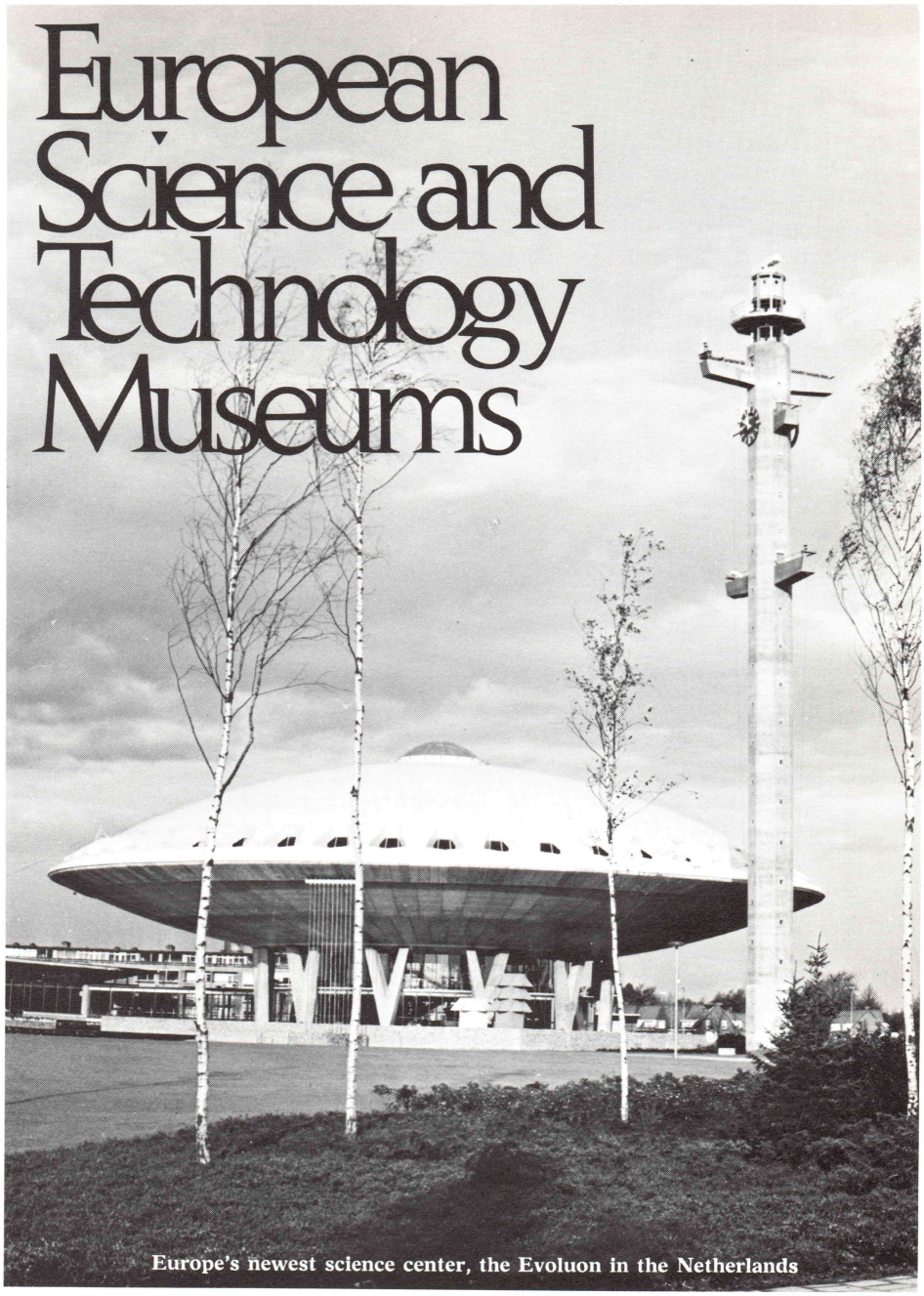
European Science and Technology Museums

Victor J. Danilov

About 50 years ago, Charles R. Richards, then director of the AAM, wrote *The Industrial Museum,* a book that dealt with the emergence of science and technology museums. He extolled the virtues of applied science museums in Europe and bemoaned the fact that the United States, "one of the foremost industrial countries of the world," did not have a museum of science and technology:

> Can we afford to omit from our educational program the story of what has made us? We have developed a high type of industrial organization and as a people we are the first to utilize the fruits of new inventions. Shall we leave other nations to grow wise through the study of our achievements and ourselves neglect their meaning and their inspiration? To tell the story adequately we need the industrial museum.

During the half century since Richards' book was published, dramatic changes have taken place in the science and technology museum field both in Europe and America. This country, for instance, has the Smithsonian Institution's National Museum of History and Technology, the Henry Ford Museum in Dearborn, Michigan, and contemporary science and technology centers in nearly 30 metropolitan areas.



Europe's newest science center, the Evoluon in the Netherlands

Four European Examples

Richards cited four European technical museums as examples for Americans to study—the Musée National des Techniques at the Conservatoire National des Arts et Métiers (National Museum of Technology at the National Conservatory of Arts and Trades) in Paris; the Science Museum in London; the Technisches Museum für Industrie und Gewerbe (Technical Museum of Industry, Crafts and Trades) in Vienna; and the Deutsches Museum (which had an unwieldy name, the German Museum for the Preservation of the Mysterious Past in Natural Science and History of Engineering) in Munich.

The world's first technical museum opened in 1799 at the Conservatoire National des Arts et Métiers, which was a product of the French Revolution. Founded in 1794, the conservatory was a school for the study of the applied arts and sciences. The museum helped to explain the operation and use of tools and machines. Although much of the early collection consisted of examples of the latest technical developments, historic objects began to dominate in 1814 with the receipt of large quantities of scientific relics. In later years, the museum became primarily a storehouse for artifacts.

The Science Museum in London was a spinoff of the "Great Exhibition of the Works of Industry of All Nations" held in 1851 in the Crystal Palace. It added a new dimension to the technical museum by displaying collections of foods, animal products, building materials, educational apparatus and other material—much of it from the international exposition. The museum originally was part of the South Kensington Museum of Industrial Art, founded in 1857. However, in 1909 the art collections of the South Kensington museum were transferred to the Victoria and Albert Museum, and the ma-

Victor J. Danilov *is director of the Museum of Science and Industry, Chicago, and president of the Association of Science-Technology Centers.*

chinery, ship models, science instruments and other such collections formed the separate Science Museum.

The Technisches Museum für Industrie und Gewerbe in Vienna also was the result of trade fairs—the International Exposition of 1873 and the Austrian Exposition of 1908—as well as the combination of a number of specialized technical collections. Emperor Franz Joseph helped lay the foundation stone in 1909, but the museum was not completed and opened until 1918. Like its predecessors, it emphasized artifacts, but also contained some examples of contemporary science and technology.

The Deutsches Museum in Munich was the creation of Oskar von Miller, a leading German electrical engineer who was involved in organizing two major electrical expositions. Unlike the other technical museums, it included working sectioned models, demonstrations and participation devices to illustrate scientific, engineering and industrial history and principles. Founded in 1903, the museum opened exhibits in the former National Museum in 1906 and old Isar Barracks in 1909 before settling at its permanent site in 1925.

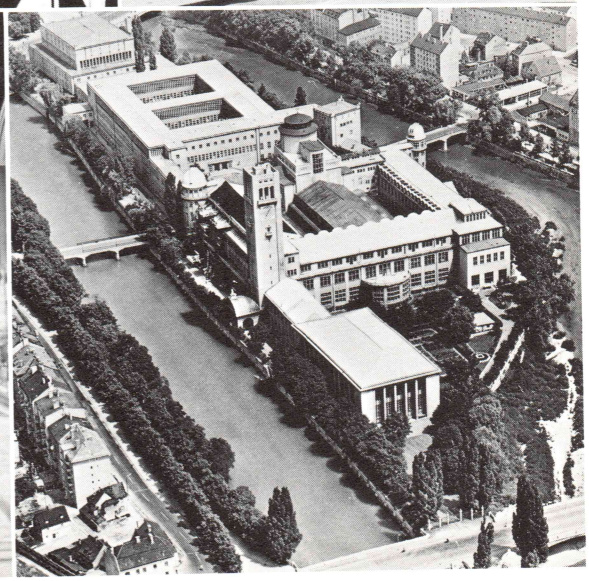
Visitor Participation

The Deutsches Museum was among the first of the new-style contemporary technical museums, which made extensive use of participatory techniques. It was the prototype for America's first contemporary science and technology museums—the Museum of Science and Industry in Chicago, founded in 1926 and opened in 1933; the New York Museum of Science and Industry, which was launched with great fanfare in 1930 and died quietly in the 1950s; and the Franklin Institute Science Museum, which opened in 1934, but traced its heritage to 1824.

In the half century since the publication of Richards' book, the Paris and Vienna technical museums have changed little. A visitor to the Conservatoire National des Arts et Métiers would still find rows of dusty cases containing pre-20th century artifacts, and it would be necessary for an attendant to turn the room lights on in order to see the collections. In Vienna, a visitor would find the common European approach to technical museums: historic machines, instruments and vehicles are exhibited but few new communication techniques are used.

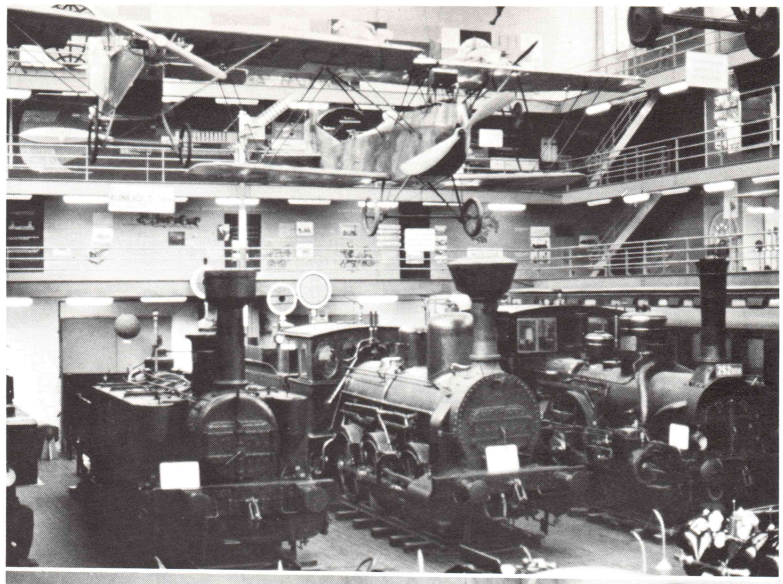
Although they are still collection oriented, the Science Museum in London and Deutsches Museum in Munich have changed somewhat, partly in response to exhibit technique innovations at American science centers and at new institutions in France and the Netherlands.

The Science Museum, which has one of the world's most extensive collections of scientific and technological artifacts, has recognized the need for a more effective way to reach children. Several decades ago it opened a children's gallery, where youngsters learn scientific principles and applications by touching and interacting with exhibits. Participatory techniques explain mechanics and physical phenomena, while activated dioramas and other exhibit units show the development of transportation and communication. As in American science centers, there are also exhibits presented by industry, such as a steelmaking installation.

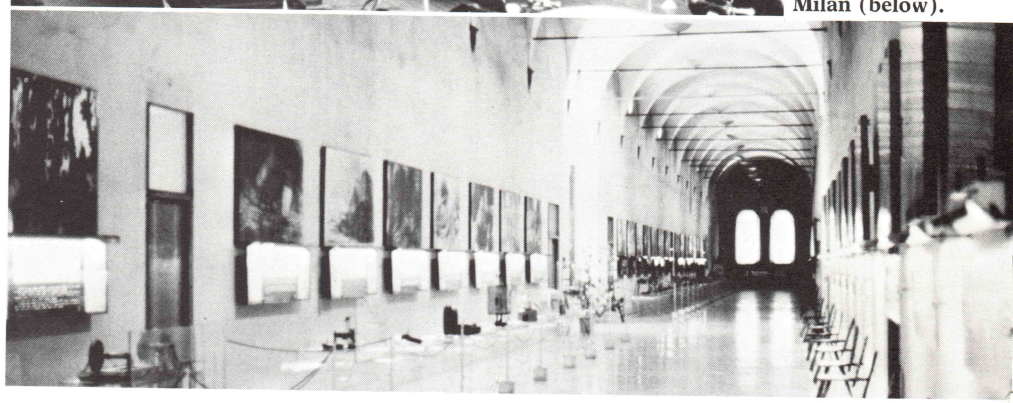


Clockwise from right: The Palais de la Découverte (Paris); the Musée National des Techniques at the Conservatoire National des Arts et Métiers (Paris), Europe's first technical museum; the Deutsches Museum, Munich; "hands-off" exhibits at the Conservatoire National; operating steam engine at the Science Museum, London.

The Deutsches Museum was a pioneer in visitor participation techniques, but only recently have its exhibits been designed for individual rather than group interaction on any large scale. The new chemistry hall, which enables the demonstration of numerous chemical principles and experiments with the touch of a button, typifies the changing approach. Air raids destroyed or damaged about 90 percent of the Munich museum's collections during World War II. When the exhibits and buildings were restored, new exhibit methods were incorporated wherever practical.



The Narodni Technicke Muzeum in Prague (left) has an extensive collection of old cars, trains and planes.



Da Vinci model replicas are displayed at the Museo Nazionale della Scienza de della Tecnica in Milan (below).

Traditional Objectives

The traditional mission of European science and technology museums—such as those in Paris, London, Vienna and Munich—has been similar to that of the Smithsonian's Museum of History and Technology. Each is charged with collecting and preserving historic artifacts and transmitting its nation's scientific and technological heritage to future generations. In some instances, the museum also has served as an instrument for training industrial workers and craftsmen. Only in recent years have these institutions become vehicles for furthering mass public understanding and appreciation of scientific principles, technological applications and social implications.

European science and technology museums fall into four categories—institutions that are considered technical museums, such as those described earlier; specialized industrial museums; science museums, concerned primarily with the history of science; and science centers, similar to American contemporary science and technology centers.

There are approximately 20 technical museums in Europe. Some trace their lineage to the 19th century: the Soviet Union's Polytechnical Museum was founded in Moscow in 1872, and Poland's Muzeum Techniki (Museum of Technology) began in Warsaw in 1875. Others are relatively new, such as Italy's Museo Nazionale della Scienza de della Technica (National Museum of Science and Technology), established in Milan in 1953, and Bulgaria's Musee National Polytechnique (National Polytechnical Museum), opened in Sofia in 1969.

European technical museums traditionally collect, restore, preserve, study, display and sometimes interpret historic objects. In addition, they work with schools in bringing classes to view the artifacts and often to see scientific or technical demonstrations presented by curators, technicians and others.

These museums make minimal use of participatory and other new exhibit techniques. There are few interactive educational exhibits in the American science center sense. In most European technical museums, constructed exhibits consist of dioramas, replicas and working models—usually operated by a museum staff member rather than by the visitor.

Change is Evident

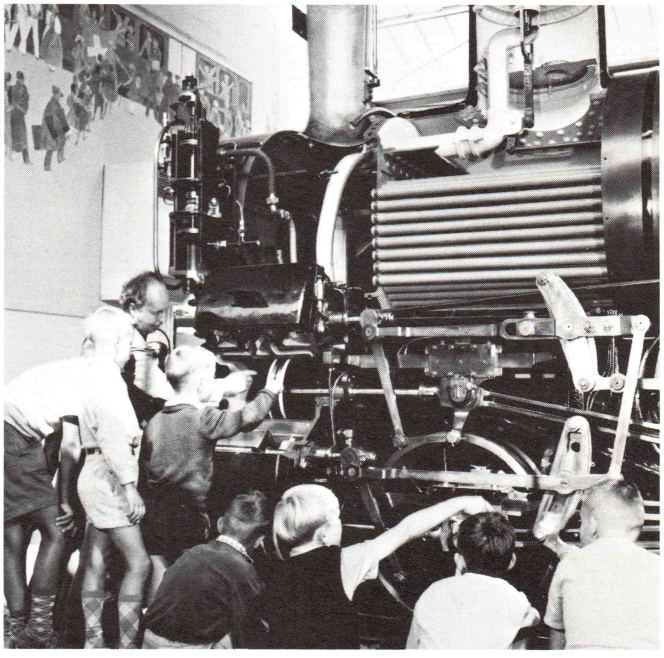
But there are signs of change. Greater emphasis on public involvement in exhibits is evident. The Narodni Technicke Muzeum (National Technical Museum) in Prague, for example, has installed push-button narrations in four languages in many of its exhibit halls. The Polytechnical Museum in Moscow has sent its director to America to consider the use of our techniques and methods in the museum's exhibit program.

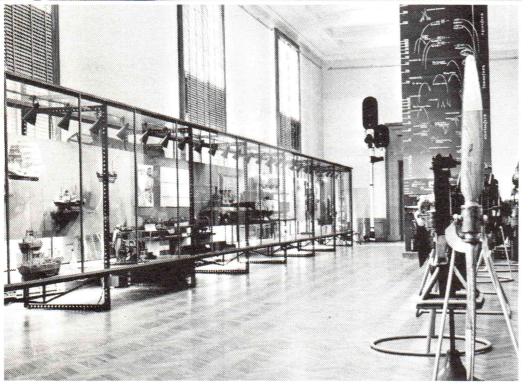
The special-purpose industrial museums also are changing, although their prime goal remains the collection of historic vehicles, agricultural equipment, postal materials, marine equipment and other specialized artifacts.

The Swiss Transport Museum in Lucerne, for example, installed Cosmorama, a major new multimedia attraction, in 1972. The milestones of space flight are projected on a 1,830-square-foot screen in a spectacular show. The Geological Museum of London has added "The Story of Earth," a large, colorful participatory exhibit on the formation and nature of our planet. The Nederlands Postmu-

The Danmarks Tekniske Museum in Helsingor, Denmark (left) is a traditional science and technology museum.

A 1909 steam locomotive at the Swiss Transport Museum (below) has been cut away to allow young people to examine its parts.





Transportation exhibit hall at the Muzeum Techniki, Warsaw

seum in The Hague, which is concerned with both the history and present operations of the postal, telegraph and telephone services, offers direct participation and explanatory demonstrations.

Virtually no change is evident at museums devoted to the history of science, which resemble history rather than science museums. They contain invaluable scientific instruments and other artifacts from Galileo, Newton, Huygens and other early scientists, but their orientation differs from that of technical museums. Their collections are aimed at specialists rather than at the general public.

The most exciting developments in European museums have occurred in contemporary science centers, which make extensive use of all types of participatory techniques.

The Palais de la Découverte (Palace of Discovery) in Paris was the first of Europe's new-breed science and technology museums to move away from the emphasis on artifacts. Founded in 1937 as a result of the International Arts and Techniques Exhibition, the institution seeks to further science education and understanding through participatory exhibits and demonstrations. It has few historic objects and many constructed exhibits designed specifically for public interaction and educational purposes. Of the European museums, it most closely resembles American science and technology centers in its operational approach.

With the assistance of University of Paris graduate students, the Palais de la Découverte presents an almost endless array of scientific experiments involving school groups and the general public. Included are such diverse displays as Faraday's cage (an experiment in which students in an enclosure are protected from strong electrical discharges); the use of a cryogenic machine to produce supercold liquids; the spinning of a visitor on a stool to demonstrate principles of mechanics; the production of radioactive bodies by bombardment with neutrons; and the simulated landing of a Concorde supersonic jet.

The Palais de la Découverte exhibits many scientific instruments that may be operated by visitors, including microscopes, electronic testing equipment, closed-circuit television and an IBM 1130 computer. It also offers such facilities and services as an extensive library, traveling exhibits, study camps, laboratory and factory visits, film and lecture series, and participation in scientific expeditions and research projects.

The Nederlands Instituut voor Nijverheid en Techniek, established in Amsterdam in 1952, has a somewhat different orientation. It seeks to serve as an information center for technical and industrial education, and directs its efforts at helping youngsters make career decisions.

The exhibits are a combination of three-dimensional contemporary ob-

(continued on page 71)

A View of the Castle

James M. Goode

Many of the 25 million people who are expected to arrive in Washington, D.C., this summer will visit various museums of the Smithsonian Institution during their explorations of the nation's capital. Few will be aware, however, of the important history connected with the Smithsonian's original home (the Smithsonian Building, popularly known as the Castle) or of that building's continuing restoration. From the red sandstone Castle on the Mall, administrative headquarters of the Smithsonian throughout its 130-year history, has evolved the largest complex of public museums in the world.

James M. Goode *has served as curator of the Smithsonian Building since 1971. He is the author of* Outdoor Sculpture of Washington, D.C., *published in 1974 by the Smithsonian Institution Press.*

Smithsonian guests and visitors enter the Castle from a massive carriage porch on the north, and pass into an octagon-shaped lobby. To the left is the Smithson crypt: Here is the elegant marble sarcophagus containing the remains of James Smithson (1765-1829), the British chemist and mineralogist who left his fortune to establish an institution for "the increase and diffusion of knowledge among men."

The founder, a graduate of Oxford University and brilliant member of the Royal Academy, appears to have been attracted to American democratic ideals by the circumstances of his birth: Smithson was the illegitimate son of the Duke of Northumberland. Never really accepted as part of his society, he spent most of his life on the Continent as a gentleman scientist, publishing papers on his research findings.

Few museums in the nation have had a more controversial beginning than the Smithsonian Institution.

Upon the death of Smithson's nephew in 1836, the United States became heir to the fortune, but his will was contested by a distant relative. President Jackson dispatched American diplomat Richard Rush to the London courts where, after two years of litigation, the United States won the case.

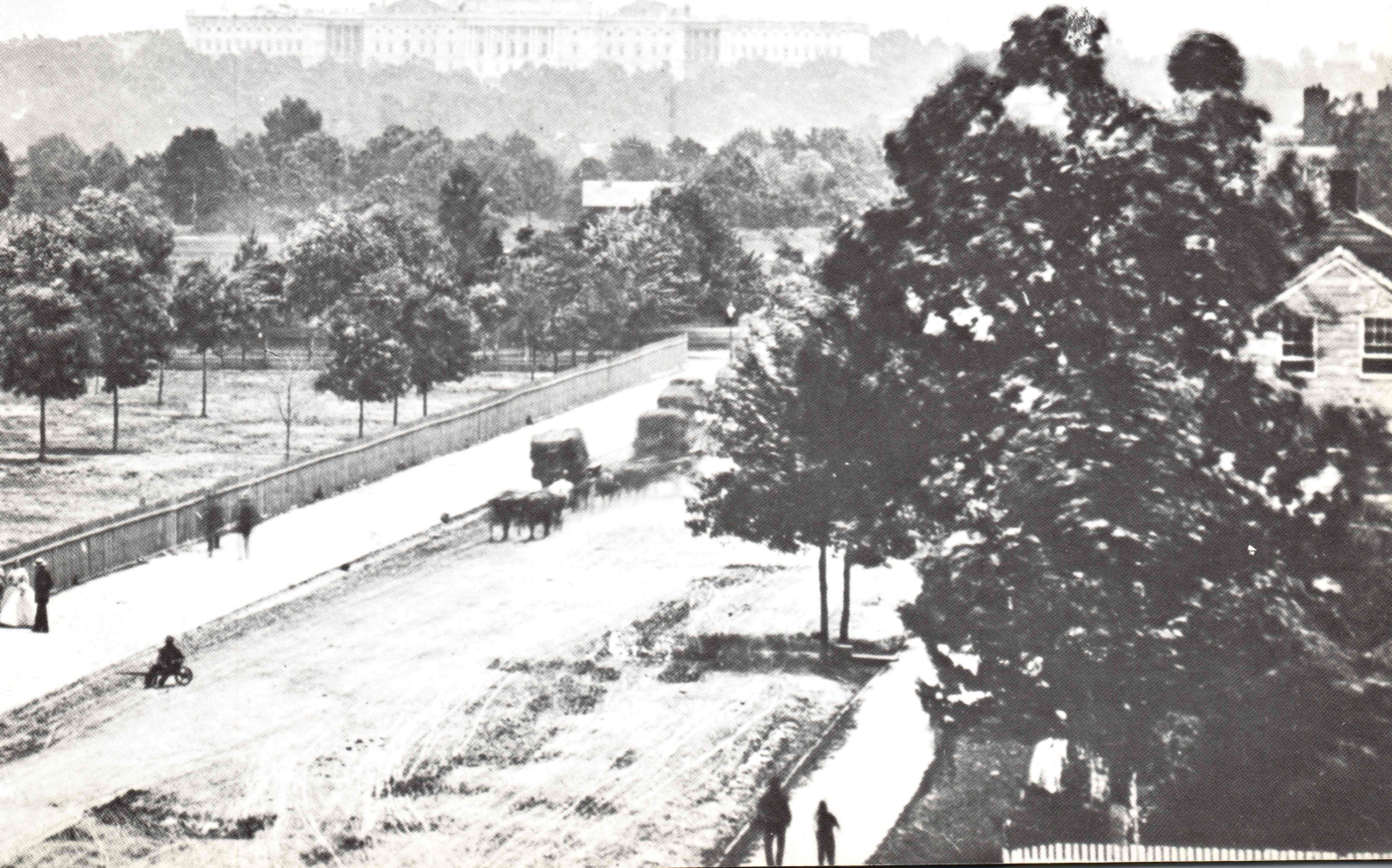
Congress spent an additional eight years in debate over how to realize a Smithsonian Institution. A number of bills were considered and rejected, advocating an observatory, agriculture college, national library and national museum.

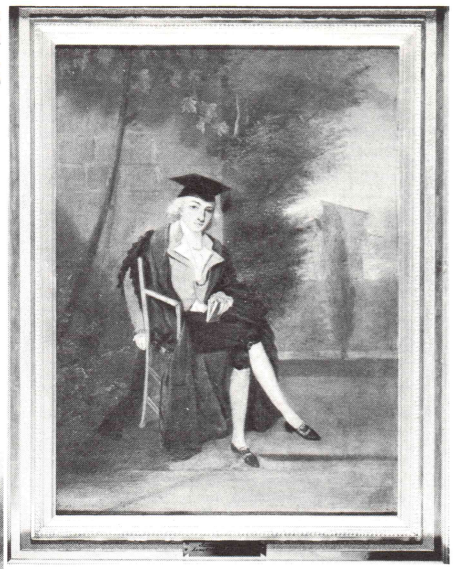
The idea of a national museum was first instigated by the National Institute for the Promotion of Science, a private organization formed in 1840 by South Carolina statesman Joel R. Poinsett. The institute's officers secured permission to open a small gallery in the Patent Office Building, and then set out to obtain the Smithson bequest.

Nearly every decision made by the institute's officers ended in disaster.

Poinsett offended the commissioner of patents by attempting to take over more of the Patent Building's first-floor space—then used for patent-model exhibition—to display natural history specimens collected by Captain John Wilkes' Navy Exploring Expedition (1838-1842). Wilkes himself was infuriated when he returned to Washington to find that the inexperienced institute curator had ruined many of the specimens by removing their "unattractive" labels or by drying out other pickled specimens to mount them more easily for display. To the surprise of almost no one in the American scientific community, the institute failed in its bid to secure the Smithson estate.

A compromise chartering the Smithsonian Institution, authored by Rep. Robert Dale Owen of Indiana, was finally passed by Congress and signed into law in August, 1846. The legislation authorized the Smithsonian to conduct scientific research and to erect a building that would house a library, art gallery, museum and lecture halls. The Smithsonian's





Founder James Smithson as an Oxford student, 1786

The Smithsonian's first secretary, Joseph Henry, and his family on the mall in 1862 (below)

The west range in 1862 was used as a reading room and exhibit gallery for Indian portraits and artifacts.

An 1862 view of the Great Hall by Patent Office clerk Titian Peale is considered one of the earliest photographs of an American museum interior.

first board of regents immediately appointed a three-man committee, with Owen as chairman, to select the building design. In September they traveled to Philadelphia, New York, Boston and Cincinnati to study major buildings of the neoclassical and Gothic revival styles. (Owen and his brother strongly favored the Gothic style and thus were to have a major influence on the architectural competition for the building.) The competition was announced to the public later in the month—before the Smithsonian had a director and a program of activities to help guide plans for the building.

Competing architects were instructed to include in their designs a chemical laboratory, art gallery, lecture rooms and museum gallery. One design, a medieval revival building by James Renwick, Jr., so pleased Owen that the decision was made before all of the entries had been submitted.

The other architects objected strongly to the manner in which the regents had conducted the competition. Their criticism was published by architect David Henry Arnot in a pamphlet entitled, *Animadversions of the Proceedings of the Regents of the Smithsonian Institution, in Their Choice of An Architect*. While many of Arnot's claims were justified, the regents were unyielding. However, they did award each of the architects $250 for his efforts.

Far more significant in determining the future of the fledgling institution was the regents' selection of Prof. Joseph Henry of Princeton College, an eminent physicist, as the first secretary of the Smithsonian. Henry responded quickly with a proposed program of activities: The Smithsonian would carry on original research, especially in those fields where other institutions were not involved, and would distribute these findings internationally through a publications program. Museums, public lectures and library activities were clearly secondary to his encouragement of research. But much to Henry's

Inventor Lucius D. Copeland demonstrated his steam-propelled tricycle, a predecessor of the automobile, before the Castle's main entrance in 1888. The Smithsonian's first curator of transportation, J. Elfreth Watkins, stands at far right.

dismay, by the time his appointment was confirmed in December, 1846, the regents had already decided to embark on building Renwick's enormously expensive Castle.

The design, in the Norman style of the latter 12th century (which included late Romanesque and early Gothic motifs) consisted of a 450-foot-long building, basically symmetrical in plan, with a two-story central block and asymmetrical wings to the east and west. Nine variously shaped towers gave the building its fashionably romantic and asymmetrical appearance. Marble was originally considered, then rejected as the building material when sandstone was found to reduce costs considerably. A local red sandstone quarried in nearby Seneca Creek, Maryland, was transported easily by waterway to within one block of the construction site.

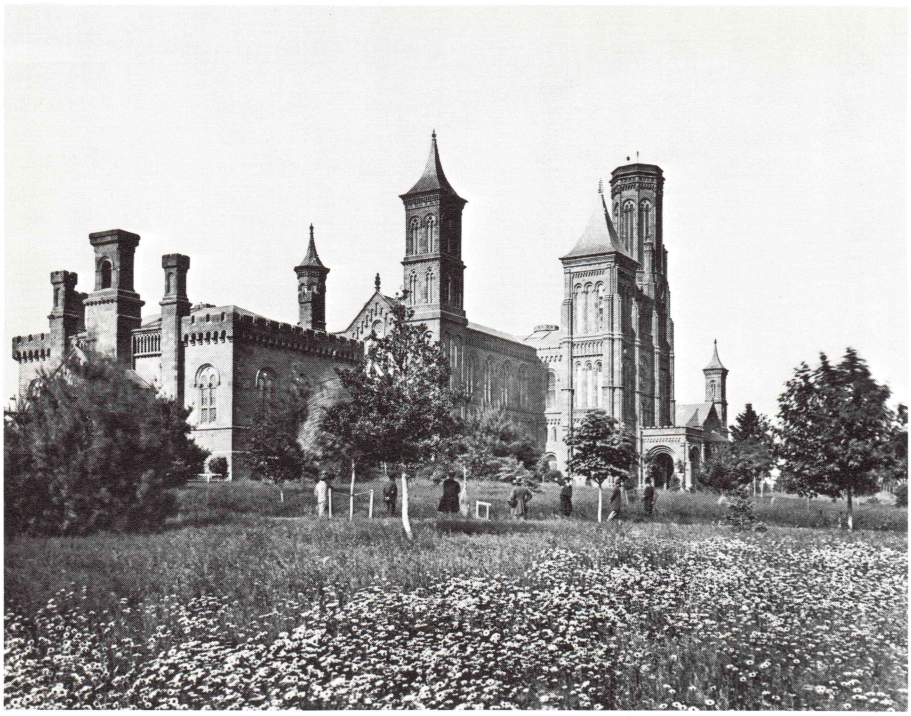
With the laying of the cornerstone by President Polk in May, 1847, construction was begun on the wings. Henry and his family moved into the second floor of the east wing in April, 1849, where they resided until the secretary's death 28 years later.

The eight years of building construction were unusually difficult for the staff who had to work amid the curiosity seekers and construction crews. Henry wrote of this in 1852:

> In the present condition of affairs there is no part of the edifice to which the public has not access, and, consequently, business has to be transacted amidst constant interruptions. The loss of time and effective life to which all are exposed who occupy a position of notoriety in the city of Washington is truly lamentable, and where this is enhanced by facility of access to gratify mere curiosity the evil becomes scarcely endurable. Progress in business under such circumstances can only be made by an encroachment on the hours usually allotted to rest, and that, too, at the expense of wasted energies and shortened days.

Moreover, Henry was distressed by the cost of the Castle and its impractical design. While the building was under construction, he recommended alterations that would better suit the needs of his research staff and the collections. He succeeded in relocating the museum in the Great Hall, a one-story chamber with Gothic piers rising 30 feet to support the ceiling. For many decades this space would be used as a museum of natural history.

Other oddly shaped areas had to be adapted for uses that were wasteful of space. The west wing, for example, designed by Renwick to appear as the 60-foot-high chapel of a castle, was used as the Smithsonian library. Here Assistant Secretary Charles C. Jewett worked tirelessly to build the book collection. His constant efforts in building a national library at the expense of scientific research worked directly against the secretary's program, with the result that Jewett was dismissed in 1855 and the library was donated to the Library of Congress in 1866.



Civil War photographer Mathew Brady's view of the Castle's north facade, circa 1861 (above)

The two chairs flanking the mirror in the Regents' Room (right) are part of the original Renwick furniture that survived the 1865 fire.

The Smithsonian collection was substantially enriched during the 1850s with thousands of natural history specimens collected by government expeditions in the Far West. Henry believed that these collections should be used for scientific study, not for popular display. Aware that it was difficult to conduct research in the medieval-style castle and that the collections would ultimately fill the building, Henry suggested in 1853 that the government endow a separate museum under the Smithsonian's supervision. Four years later Congress was induced to grant $15,000 for the construction of a massive iron balcony around the Great Hall to provide additional working space for the scientists and for display cases for specimens on the main floor. This federal support was the beginning of a national museum.

Assistant Secretary Spencer F. Baird devoted much of his time to organizing the collections of natural history and guiding the Smithsonian's publications program. The other antebellum collections were extensive: a large number of marble busts of American statesmen (transferred from the National Institute shortly before it ceased operation); plaster casts of ancient sculpture; an enormous collection of Indian portraits by George Catlin, Charles King and John M. Stanley; and objects given to the Department of State by foreign governments. By the outbreak of the Civil War, the Smithsonian's library and museum were considered among the largest in the country.

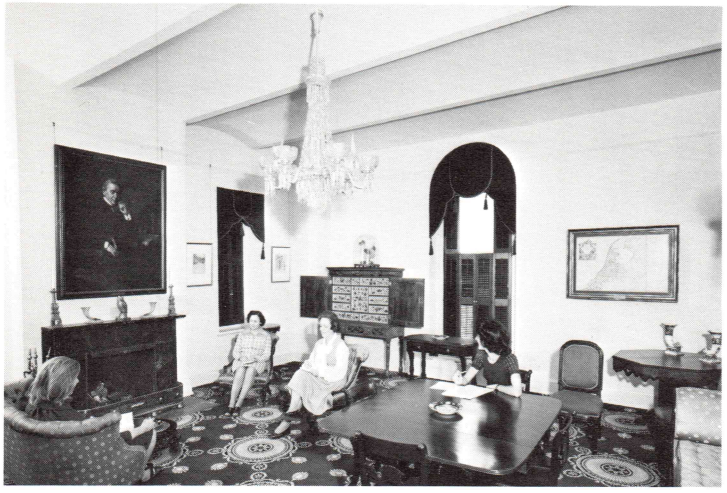
A serious fire in the Castle temporarily interfered with the growth of the collections. Fire was a constant threat to the building. In the midst of construction the wooden interior of the central section was changed to a fire-resistant stone structure. Every precaution was taken to prevent fire: smoking was not permitted in the building; open lights could not be carried at night; buckets and barrels of water were accessible throughout the Castle. A watchman checked the rooms every night.

All of these precautions notwithstanding, on the night of January 24, 1865, the central section of the Castle caught fire and burned, destroying the second floor and the three largest towers. The fire consumed many of the Smithsonian's early records, most of Smithson's personal papers and several hundred Indian portraits, as well as the contents of two libraries that had been seized by Union troops and stored in the Castle by the Secretary of War. The fire's origin was traced to an iron stove pipe that had been rammed through a hole in the ceiling leading to the attic rather than outside.

The Castle was reconstructed from 1865 to 1867 by Adolph Cluss, Washington's leading architect, who followed the original plan on the exterior. All of the principal rooms were altered with the exception of the west wing, which remains one of the most spectacular interiors in Washington.

Henry, who had been initially distressed at the enormous expense of the original construction, was forced to devote more time and labor to the rebuilding efforts. After this project was completed, he reemphasized the importance of original research rather than a showy building or an impressive collection.

A group of government officials gathered in the Great Hall (1927) included President Calvin Coolidge (front row center), William Howard Taft (at his left), Herbert Hoover (second row behind Taft and Coolidge) and Andrew Mellon (front row left).



The Secretary's Parlor contains several furniture styles, draperies reproduced from a Civil War photograph of the room, and a carpet copied from an 1850s pattern.

Every architectural detail of the west range remains as it was in 1852. The room now serves as a dining commons for Smithsonian Associates and staff.

In 1868 he wrote:

> It is not by its castellated building nor the exhibition of the museum of the Government that the Institution has achieved its present reputation, nor by the collection and display of material objects of any kind that it has vindicated the intelligence and good faith of the Government in the administration of the trust. It is by its explorations, its researches, its publications, its distribution of specimens, and its exchanges, constituting it an active, living organization, that it has rendered itself favorably known in every part of the civilized world, has made contributions to almost every branch of science, and brought more than ever before into intimate and friendly relations the Old and New Worlds.

The Philadelphia Centennial of 1876 had a most profound effect on the Smithsonian, more than doubling the museum's collections. As early as 1875 Henry was aware that many of the objects displayed at the Centennial exposition would be donated to the national museum. He suggested adding three enormous wings to the south side of the Castle to accommodate the new collections. Assistant Secretary Baird proposed that the Government Building in Philadelphia be dismantled and reerected next to the Castle. Neither plan proved feasible. In the end, Congress appropriated funds to build the U.S. National Museum, the first separate Smithsonian museum—a red brick Romanesque revival exhibition hall known today as the Arts and Industries Building. (This whimsical late Victorian fantasy has recently been furnished with a major Bicentennial exhibition on the Philadelphia Centennial Exposition.)

After Henry's death the Castle continued to undergo changes. Between 1884 and 1886 Adolph Cluss installed the first electric lighting, an elevator and the first telephones, and remodeled interiors in the west range. Upper floors were added in the east wing and east range, exterior modifications that are barely noticeable because the architect carefully maintained original decorative motifs.

In 1902, Secretary Samuel P. Langley added a children's museum in the south tower, adjacent to the Great Hall. It was installed with an art nouveau-style mosaic floor, a cast-iron ceiling decorated as a grape arbor in the art nouveau style, glass cases containing stuffed birds and aquariums "chosen to excite the wonder of children." While this area is currently used as the Smithsonian Associates reception center, visitors can still inspect the vestiges of this early experiment in museum education for children: the 1902 floor and ceiling remain intact.

The Smithsonian's position in the museum world has continued at an ever-quickening pace since the late 19th century, with the opening of eight new and separate museums: the National Zoological Park (1890), National Museum of Natural History (1911), Freer Gallery of Art (1923), National Museum of History and Technology (1964), Anacostia Neighborhood Museum (1967), National Collection of Fine Arts–National Portrait Gallery (1968), Renwick Gallery (1972), and Hirshhorn Museum and Sculpture Garden (1974).* Two new

* The National Gallery of Art (1941) and the John F. Kennedy Center for the Performing Arts (1971) are independently operated parts of the Smithsonian complex.

museum buildings will open in 1976, the National Air and Space Museum and the Cooper-Hewitt Museum of Decorative Arts and Design in New York.

The Castle's slow physical decline over a period of decades resulted from the Smithsonian's preoccupation with its new museums and the continual alterations to the building. With the appointment of Dr. S. Dillon Ripley as the eighth secretary in 1964, a massive restoration program was initiated.

In that year the Smithsonian Institution furnishings collection began under the direction of Dr. Richard S. Howland, special assistant to the secretary. Howland carefully marshalled a limited budget to begin purchasing important pieces of Victorian furniture for the Castle's principal reception rooms and offices. Many items were donated by Washington families whose Victorian homes had been demolished in the 1950s and 1960s for urban renewal or for modern office buildings.

With the burgeoning furniture collection safely in storage, the Castle renovation was carried out from 1967 to 1970 with a grant from Congress.

A new peaked roof for the north tower, missing since the fire of 1865, was built to reconstruct the silhouette originally intended for the main (north) facade. A local Washington sculptor spent nine months repointing the stonework and reconstructing missing Gothic revival finials and other decayed stonework. Lancet muntins were replaced in many of the windows, and the ivy was trimmed to expose many unusual architectural details.

The entire building was laid with Victorian pattern carpeting; interior wooden louvered blinds were installed in many of the windows; and an entire floor was added to the upper section of the building (the original design was destroyed in the 1865 fire). New elevators were installed as well as central air-conditioning, which permitted removal of unsightly window units.

In the Great Hall, the massive Gothic piers, of white plaster over a brick shell, were marbleized (painted to resemble colored marble) in the mid-19th-century style. A muted red and gold carpet complements the piers and helps to unify the massive space.

The west range and west wing, originally the library and reading room, have been transformed into an impressive salon and dining room. The west range, now called the Lounge, is furnished with a mixture of 19th-century styles suggesting a later Victorian interior. Painted buff and persimmon, the Lounge sparkles with light from the lanceted Gothic clerestory windows. A Gothic revival organ in the Lounge is used on special occasions.

Smithsonian staff and associates are seated for luncheon in the chapel-like Commons, with its rose window, around tables and chairs copied from Victorian prototypes. The ceiling is scattered with gold stars on a field of blue, a design copied from an original painted ceiling at Lyndhurst, the Gothic revival mansion on the Hudson River. Nineteenth-century patent models from a collection of 3,000 acquired by the Smithsonian in 1926 are displayed in the original walnut bookcases which line the walls.

Another restoration project underway is a Victorian-style garden behind the Castle and adjacent to Independence Avenue. This area was cleared of its temporary buildings and parking lot earlier this year and landscaped according to the 1850 plan of Andrew Jackson Downing with a pattern of winding foot paths, evergreens, Victorian flower beds and park benches. Plans call for the eventual construction of massive iron and stone gates, designed by Renwick but never erected, for the south entrance to the garden, as well as fountains and other embellishments.

The Castle is not only the administrative headquarters of the Smithsonian but also the home of other offices having diverse interests. The Woodrow Wilson International Center for Scholars, which opened in the Castle in 1971, occupies much of the space in the upper floors.

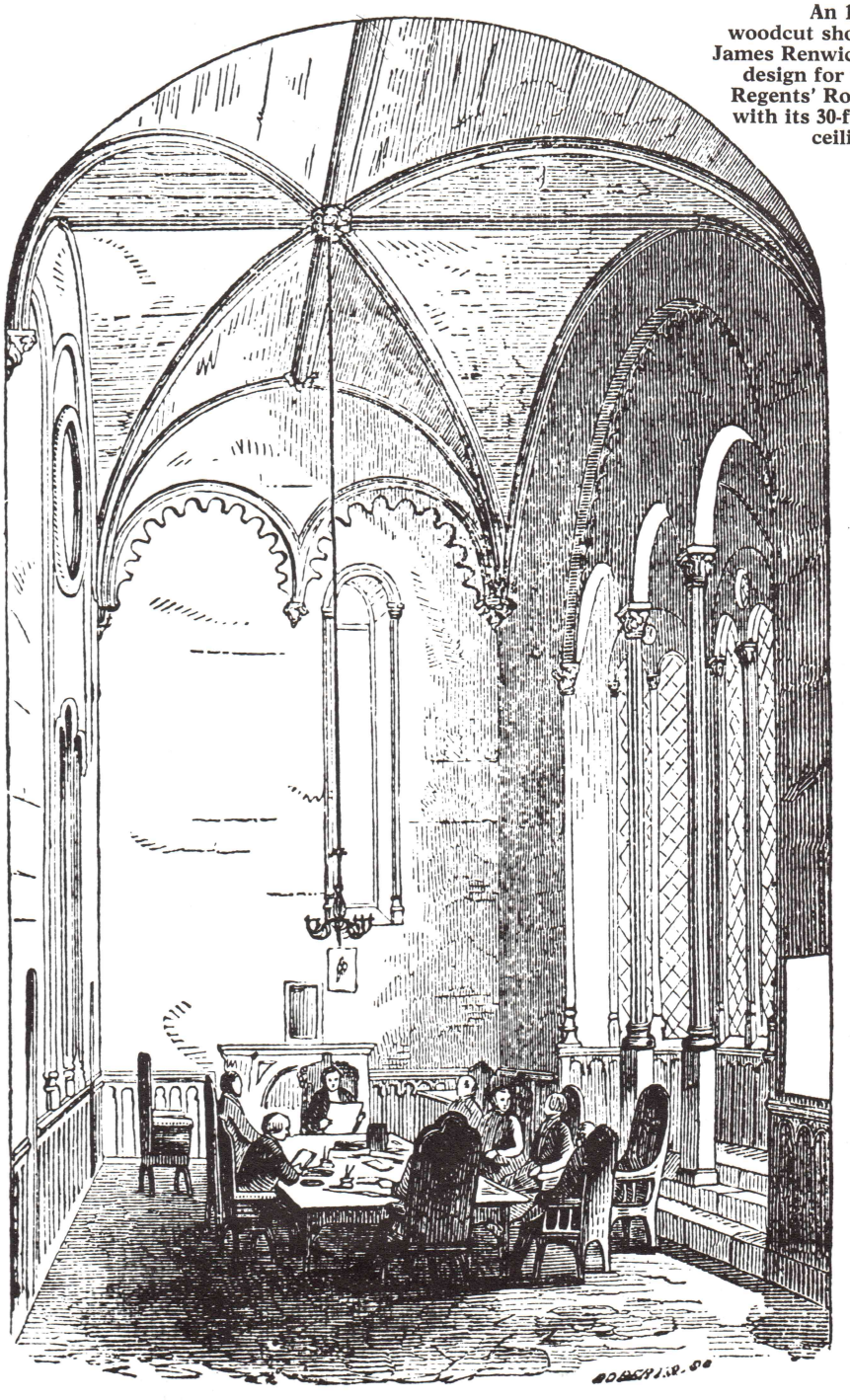
Each year approximately 20 students from the United States and abroad undertake advanced research at the center.

Other offices in the Castle include the Smithsonian Bicentennial office, the Joseph Henry Papers Project (some 15 volumes of his papers are being collected, edited and published), and the Office of Academic Affairs, which administers grants to selected graduate students and places them with Smithsonian curators in their fields of interest.

The Castle has been brought into contemporary relevance through restoration—not restoration in the strict sense, but a restoration that reflects a sensitive appreciation for architecture and early Victorian decorative arts. The result has been amazing. What was once a dingy old Gothic revival curiosity has become a part of Washington life. The Castle stands proudly as a symbol of the growth and development of the entire Smithsonian Institution, and of the successful efforts to preserve one of America's outstanding Victorian buildings. △

Opposite page top: President and Mrs. Ford hosted a state dinner at the Castle for the Emperor and Empress of Japan in 1975. Bottom: An exhibit on the nation's capital was installed in the Castle in early 1976.

An 1857 woodcut shows James Renwick's design for the Regents' Room with its 30-foot ceiling.



REGENTS' ROOM.

In Praise of Technology

(continued from page 29)

with the authors we have considered, McDermott asserted that "we now observe evidence of a growing separation between ruling and lower-class culture in America, a separation which is particularly enhanced by the rapid growth of technology." This is happening, according to McDermott, because "almost all of the public's business is carried on in specialized jargon," and "the new new language of social and technical organization is divorced from the general population."

This is persuasive rhetoric, but not in accordance with the facts. My teenage sons read articles in *Scientific American* on computers, quasars and laser beams with much readier comprehension than most of the pieces they are apt to find in *The New York Review of Books.* A typical plumber or gas station attendant, or even a bank teller who owns a secondhand car, knows more about society's technical systems and "the august mystery of science" (McDermott's phrase) than any dozen Establishment people such as bank presidents, political bosses and Mafia godfathers. I pick up a book entitled *How Things Work,* intended for children of primary school age. It contains straightforward discussions of electricity and magnetism, internal combustion engines and rockets. With the help of simple diagrams, it explains the workings of carburetors, thermostats, transistors and dozens of other devices. Where is all the mystery?

There are obscure specialties, to be sure, more than there have ever been. There was, for a time, much concern about a schism between the "two cultures," a phrase made famous by C. P. Snow in 1959. But Snow observed in 1963 that the divide seemed already to be closing, and with the growth of public concern about ecology and conservation, the general public is becoming more conversant with technological subjects rather than less so. (This can hardly be said, however, about the mysteries of economics, political science and contemporary developments in the arts.)

Ah, Wilderness!

Next we must confront the charge that technology is cutting man off from his natural habitat, with catastrophic consequences. It is important to point out that if we are less in touch with nature than we were—and this can hardly be disputed—then the reason does not lie exclusively with technology. Technology could be used to put people in very close touch with nature, if that is what they want. Wealthy people could have comfortable abodes in the wilderness, could live among birds in the highest jungle treetops, or even commune with fish in the ocean depths. But they seem to prefer penthouse apartments in New York and villas on the crowded hills above Cannes. Poorer people could stay on their farms on the plains of Iowa, or in their small towns in the hills of New Hampshire, if they were willing to live the spare and simple life. But many of them seem to tire of the loneliness and the hard physical labor that goes with rusticity, and succumb to the allure of the cities.

It is Roszak's lament that "the malaise of a Chekhov play" has settled upon daily life. He ignores the fact that the famous Chekhov malaise stems in no small measure from living in the country. "Yes, old man," shouts Dr. Astrov at Uncle Vanya, "in the whole district there were only two decent, well-educated men: you and I. And in some 10 years the common round of the trivial life here has swamped us, and has poisoned our life with its putrid vapours, and made us just as despicable as all the rest." There is tedium in the countryside, and sometimes squalor.

Nevertheless, I personally enjoy being in the countryside or in the woods, and so feel a certain sympathy for the antitechnologists' views on this subject. But I can see no evidence that frequent contact with nature is *essential* to human well-being, as the antitechnologists assert. Even if the human species owes much of its complexity to the diversity of the natural environment, why must man continue to commune with the landscapes in which he evolved? Millions of people, in ages past as well as present, have lived out their lives in city environs, with very little if any contact with "nature." Have they lived lives inherently inferior because of this? Who would be presumptuous enough to make such a statement?

The antitechnologists talk a lot about nature without clearly defining what they mean by the word. Does nature consist of farms, seashores, lakes and meadows, to use Reich's list? Does not nature consist also of scorched deserts, fetid tropical forests, barren ice fields, ocean depths and outer space—environments relentlessly hostile to human life? If farms and meadows are considered "natural" even though they have been made by men out of the stuff of the universe, what is "unnatural"? A stone wall and a farm cottage are still "good," I suppose, but a bridge and a dam become "bad," and a glass building facade becomes unnatural and dehumanizing, even though the glass has been made by man out of the sands of the earth.

Must one be in the wilds to be in touch with nature? Will not a garden in the backyard suffice? How about a collection of plants in the living room? Oriental artists have shown us how the beauty of all creation is implicit in a single blossom, or in the arrangement of a few stones. The assertion that men are emotionally crippled by being isolated from the wilds is, as I have said, unwarranted because of lack of evidence. But more than that, it does not take into account the multitude of ways in which "nature" can be experienced.

If pressed, the antitechnologists might grudgingly admit that the

harm of being separated from nature can be mitigated if the separating medium is graceful and in harmony with natural principles, say like the Left Bank in Paris, or the Piazza Navona in Rome. But they point to the modern city as the epitome of everything that is mechanical and antihuman.

I will not here embark on a discussion of functionalism and modern architecture. But I will note in passing that there are millions of families who have lived happy years in nondescript high-rise apartments, and millions of people who have spent pleasant working lifetimes in the most modern office buildings. To claim that such passive environments are emotionally crippling is not to state a general truth, but rather to exhibit a personal phobia.

I have seen early-morning crowds pouring into a Park Avenue office building, into a spacious lobby, via a smooth-riding elevator to comfortable offices with thick carpets and dazzling window views. I have heard them chattering of personal concerns, a boyfriend who called, a child who scratched his knee, a movie seen, an aunt visiting from out of town. These people are no more dehumanized by their environment than are a group of native women doing their laundry on the bank of a river. I have also seen these office workers on a Monday morning comparing sunburns and trading tales about picnics, hikes, fishing trips and various other sorties into the out-of-doors. The average person is not as isolated from nature as the antitechnologists would have us suppose. Ah, but this "pathetic weekend," as Dubos has told us, is not a true or meaningful relationship with nature.

There is a fussiness about the antitechnologists' abhorrence of the city, as if the drama of life could not unfold in anything but an idyllic setting. Saul Bellow, one of our leading novelists, has taken a more robust position (*Harper's*, August 1974). In his view, mankind is not about to be intimidated by anything as insignificant as a technological landscape:

> A million years passed before my soul was let out into the technological world. That world was filled with ultraintelligent machines, but the soul after all was a soul, and it had waited a million years for its turn and did not intend to be cheated of its birthright by a lot of mere gimmicks. It had come from the far reaches of the universe, and it was interested but not overawed by these inventions.

God's Good Life

The next target of the antitechnologists is Everyman at play. It is particularly important to antitechnology that popular hobbies and pastimes be discredited, for leisure is one of the benefits generally assumed to follow in the wake of technological advances. The theme of modern man at leisure spurs the antitechnologists to derision.

There are many popular pastimes contemptuously referred to as mass-cult activities—bowling, for example—that are not to my taste. But how can one draw sweeping conclusions from such a fact? A joyous, obviously exhilarating hour in a bowling alley is certainly not inferior in the scheme of things to a torpid, nonattentive hour listening to string quartets. In their consideration of recreation activities, the antitechnologists disdain to take into account anything that an actual participant might feel. For even when the ordinary man considers himself happy—at a ball game or a vacation camp, watching television or listening to a jukebox, playing with a pinball machine or eating hot dogs—we are told that he is only being fooled into *thinking* that he is happy.

It is strategically convenient for the antitechnologists to discount the expressed feelings of the average citizen. It then follows that (1) those satisfactions which are attributed to technology are illusory, and (2) those dissatisfactions which are the fault of the individual can be blamed on technology, since the individual's choices are made under some form of hypnosis. It is a can't-lose proposition.

Under these ground rules, how can we argue the question of what constitutes the good life? If most people are fooled into desiring things they do not really desire, tricked into thinking they are free when they are really enslaved, mesmerized into feeling happy when true happiness forever eludes them, then clearly we are in a sorry state. But if the people themselves do not agree that their contentment is misery, what are we to conclude?

A character in a Gide novel remarks about the moment he first realized that "men feel what they imagine they feel. From that to thinking that they imagine they feel what they feel was a very short step!" Between feeling and imagining one feels, "what God could tell the difference?"

The antitechnologists fancy themselves to be the gods who can tell the difference. They charge technologists with having formed an elite class. But what is a little extra knowledge about machines compared to the godlike knowledge that they claim for themselves? Is it not clear that they consider themselves to be the elite of all elites?

They have complained that in the scientific world view the scientist, seeking objectivity, cuts himself out of the picture, ignoring his own passions. The antitechnologists, however, in painting *their* picture of the true world, see nothing wrong with deleting the average man's passions. "As for the mass of urban workers," says Mumford, "they must have viewed their dismal lot, *if they were conscious at all*, with a feeling of galling disappointment." I have added the emphasis to the phrase which expresses so perfectly the antitechnologists' total scorn for anything that the average man might think, if indeed they credit him with thinking at all.

It is legitimate, of course, to speculate on the extent to which people's lives are dominated by debasing illusions. Ibsen's *Wild Duck* and Eugene O'Neill's *Iceman Cometh* are two dramatic works that deal with the theme of how our lives are made tolerable by self-deceit, and with the problem of what happens when simple people are abruptly confronted with "truth." But the antitechnologists are not creative artists speculating about the eternal problems of being human. They are polemicists determined to prove

that life today is worse than it used to be. At the very least, one would expect them to give weight to such evidence as is available. However, they avoid the discussion of facts, preferring to rely on such subjective impressions as the "blank, hollow, bitter faces," that Reich fancies he sees on the white-collar and blue-collar workers of America.

When real people are actually asked about their lives, Irene Loviss noted in a Harvard program on technology and society, "they believe that technology is both good and bad, and for most of them . . . the good outweighs the bad." In medical studies assessing the adverse impact on health of changes in a person's life, it has been found that timeless events such as marriage, divorce and death in the family are far more significant than anything having to do with the rule of technology in the world.

I leaf through *The Family of Man,* a book reproducing the photographic exhibition assembled in 1955 by Edward Steichen. I see 503 pictures from 68 countries, representing man in every cultural state from primitive to industrial. I see lovers embracing, mothers with infants, children at play, people eating, dancing, working, grieving, consoling. Everything really important seems eternally the same—in cities and in jungles, in slums and on farms. Carl Sandburg's prologue attempts to put it into words: "Alike and ever alike, we are on all continents in the need of love, food, clothing, work, speech, worship, sleep, games, dancing, fun. From tropics to arctics humanity lives with these needs so alike, so inexorably alike." A few moments spent studying these photos makes the attitudes of the antitechnologists seem peevish and carping. These are real people with real faces that give the lie to the antitechnologists' snobbish generalizations.

Steichen and Sandburg are yea-sayers, a refreshing and necessary breed to have around. That does not mean that there is no place for Cassandras. The antitechnologists have every right to be gloomy, and have a bounden duty to express their doubts about the direction our lives are taking. But their persistent disregard of the average person's sentiments is a crucial weakness in their argument—particularly when they then ask us to consider the "real" satisfactions that they claim ordinary people experienced in other cultures of other times.

The Cloud Over the Silver Lining

It is difficult not to be seduced by the antitechnologists' idyllic elegies for past cultures. We all are moved to reverie by talk of an arcadian golden age. But when we awaken from this reverie, we realize that the antitechnologists have diverted us with half-truths and distortions. The harmony which the antitechnologists see in primitive life, anthropologists find in only certain tribes. Others display the very anxiety and hostility that antitechnologists blame on technology—as why should they not, being almost totally vulnerable to every passing hazard of nature, beast, disease and human enemy? As for the peasant, was he "foot-free," "sustained by physical work," with a "capacity for a nonmaterial existence"? Did he crack jokes with every passerby? Or was he brutal and brutalized, materialistic and suspicious, stoning errant women and hiding gold in his mattress? And the Middle Ages, that dimly remembered time of "moral judgment," "equilibrium" and "common aspirations." Was it not also a time of pestilence, brigandage and public tortures? "The chroniclers themselves," admits a noted admirer of the period (J. Huizinga), tell us "of covetousness, of cruelty, of cool calculation, of well-understood self-interest. . . ." The callous brutality, the unrelievable pain, the ever-present threat of untimely death for oneself (and worse, for one's children) are the realities with which our ancestors lived and of which the antitechnologists seem totally oblivious.

It is not my intention to assert that, because we live longer and in greater physical comfort than our forebears, life today is better than it ever was. It is this sort of chamber of commerce banality that has driven so many intellectuals into the arms of the antitechnological movement. Nobody is satisfied that we are living in the best of all possible worlds.

Part of the problem is the same as it has always been. Men are imperfect, and nature is often unkind, so that unhappiness, uncertainty and pain are perpetually present. From the beginning of recorded time we find evidence of despair, melancholy and ennui. We find also an abundance of greed, treachery, vulgarity and stupidity. Absorbed as we are in our own problems, we tend to forget how replete history is with wars, feuds, plagues, fires, massacres, tortures, slavery, the wasting of cities and the destruction of libraries. As for ecology, over huge portions of the earth men have made pastures out of forests, and then deserts out of pastures. In every generation prophets, poets and politicians have considered their contemporary situation uniquely distressing, and have looked about for something—or someone—to blame. The antitechnologists follow in this tradition, and, in the light of history, their condemnation of technology can be seen to be just about as valid as the Counter-Reformation's condemnation of witchcraft.

But it will not do to say *plus ça change plus c'est la même chose,* and let it go at that. We do have some problems that are unique in degree if not in kind, and in our society a vague, generalized discontent appears to be more widespread than it was just a generation ago. *Something* is wrong, but what?

I would hesitate to speak out on so formidable and complex a question if at least part of the answer did not seem self-evident. Contemporary man is not content because he *wants* more than he can ever have. The story of Faust is thought of as a romantic legend, but it embodies a profound truth. *Homo sapiens,* through the evolutionary process, has developed a unique combination of curiosity, creativity and daring. These traits have been responsible for his success, while also confronting him with many serious problems. Although he has created stable societies that showed

very little cultural evolution for long periods of time, once he is exposed to a new possibility, man cannot resist sampling it. He *will* taste new fruit, forbidden though it may be. He may taste fearfully and hesitantly, but he will taste. If the elders hold back, then youth will break away. If conservatives preach caution, then radicals will arise. The new attraction might be glass beads for Indian braves or spices for Renaissance princes; it might be the idea of heavenly salvation for marauding Vikings, or the concept of equality for Russian serfs.

Man learned early that changes in his way of life could have unforeseen and adverse consequences. The antitechnologists think it very significant that this has happened in the case of technological developments such as DDT. But it is self-evident that actions have consequences, some of which may be unforeseen and undesired. Bring flowers into the house, and your aunt may have an asthma attack. Invite your neighbor for dinner, and he or she may run away with your mate. Preach a religion of love, and you may start a revolution. New technologies are only a part of man's elemental impulse to experiment. This impulse does lead man to invent, but of equal importance—and hazard—it leads him to explore, to create new arts, new religions, new ideas.

Man has always been afraid of his urge to do more and know more. His earliest myths attest to this fear: Adam and Eve, the Tower of Babel, Prometheus, Pandora, Icarus. But he is constitutionally unable to restrain himself.

Our contemporary problem is distressingly obvious. We have too many people wanting too many things. This is not caused by technology; it is a consequence of the type of creature that man is. There are a few people holding back, like those who are willing to do without disposable bottles, a few people turning back, like the young men and women moving to the counter-culture communes, and many people who have not gotten started because of crushing poverty and ignorance. But the vast majority of people in the world want to move forward, whatever the consequences. Not that they are lemmings. They are wary of revolution and anarchy. They are increasingly disturbed by crowding and pollution. Many of them recognize that "progress" is not necessarily taking them from worse to better. But whatever their caution and misgivings, they are pressing on with a determination that is awesome to behold..

Democratic Desires

The newspapers report that the Bulgarian government, bowing to consumer discontent, is attempting to provide more and better washing machines. This is not "technique" run wild or "the suave technocracy" exploiting the people. *This is Bulgarians wanting washing machines.*

It is common knowledge that millions of underprivileged families want adequate food and housing. What is less commonly remarked is that after they have adequate food and housing they will want to be served at a fine restaurant and to have a weekend cottage by the sea. People want tickets to the Philharmonic and vacation trips abroad. They want fine china and silver dinner sets and handsome clothes. The illiterate want to learn how to read. Then they want education, and then more education, and then they want their sons and daughters to become doctors and lawyers. It is frightening to see so many millions of people wanting so much. It is almost like being present at the Oklahoma land rush, except that millions are involved instead of hundreds, and instead of land, the prize is everything that life has to offer.

Now, at last, we can see what it is that motivates the antitechnologists. It is fear. They are terrified by the scene unfolding before their eyes. They see hordes of college graduates in New Delhi serving with frustration as government clerks while wanting to be senators or leaders of industry. They see blacks rioting in the ghettos for a share in American bourgeois pleasures and for status as members of the professions and the business community. They see throngs of Japanese students parading through the streets of Tokyo calling for Lord knows what. They see bricklayers demanding more money than professors, and getting it. They see firemen and teachers on strike—everyone seeking a share of whatever it is that is available. This situation has been developing ever since man emerged as a species, but it has accelerated alarmingly in our time.

The antitechnologists are frightened; they counsel halt and retreat. They tell the people that Satan (technology) is leading them astray, but the people have heard that story before. They will not stand still for vague promises of a psychic contentment that is to follow in the wake of voluntary temperance. Desperately the antitechnologists try to sell their vision of the ideal society, a sort of Viennese operetta scene, with the good and gentle populace dancing around the Maypole while the important personages (presumably including the antitechnologists) look on benevolently. But man has not come this far through the evolutionary furnace to settle for a bucolic idyll.

And why should he? If I enjoy an evening at the opera and a vacation trip to London, why should not others want the same? Some human desires can be labeled as vulgar and foolish, smacking of conspicuous consumption. Some are excessive, and doomed to lead to frustration and unhappiness. But most people are in search of the good life —not "the goods life" as Mumford puts it, although some goods are entailed—and most human desires are for good things in moderate amounts. The problem arises only when we put all of these moderate desires together and find that there is not enough of the good things to go around.

I agree with the antitechnologists that the situation is frightening. Perhaps there is some truth in the proposition that the common man would be "happier" if he did not have the urge to scramble upward to a higher station in life. But this is irrelevant because the common man does have the urge. The situation is summed up in the title of a

World War I song: "How Ya Gonna Keep 'Em Down on the Farm After They've Seen Paree?" By now most of the world has seen some version of "Paree," and we have no choice but to live with the consequences.

Schopenhauer warned us a century ago about the *will* divided against itself. Will presses forward relentlessly in each living creature, heedless of its inevitable conflict with itself. Will, or life-force, or human nature—call it whatever you like—is what is at the root of our problems. Technology is merely one expression of this force. It is illogical to place the blame on technology. Why not blame the impulse to seek beauty, which we call art, or the impulse to seek truth, which we call philosophy, or the impulse to seek the ineffable "all," which we call religion? These are the sources of man's dreams and desires. These are the urges that drive man ever onward and refuse to let him rest. Man's technological skills may be responsible for the invention of the automobile, but he wants it and uses it because of his craving for new experiences, experiences of which he can conceive only because of his highly developed esthetic sense and existential yearnings.

One of the most convincing examples of the antitechnologists' true feelings is to be found in their attitude toward tourism. What could be more reasonable than the desire people have to travel and see parts of the world different from their own? Yet this reasonable desire results in crowds of tourists, and this irritates the antitechnologists to the point of frenzy. Roszak is the most virulent, calling the tourist trade "one of the great evils . . . one of the most destructive forms of pollution," and referring to "idiocies like pre-packaged tourism (the chance to make an international nuisance of oneself)." But each of the others displays a similar attitude of annoyance. Ellul scornfully remarks that man "becomes a cosmopolite and a citizen of the world, less . . . through his own will and ideals than through the mechanical fact of easy transport." "Why, indeed," asks Mumford dourly, "should any government subsidize jet-age travel when the net effect is to ruin every landscape and every historic site to which we bring our jet liners and motor coaches?" Dubos expresses his distaste by commenting that "the overwhelming majority of urban dwellers . . . identify leisure time with essentially aimless movement." Reich includes "vacation trips to Europe" among the extraneous features of our "affluent American way of life," and mocks the young couples who "manage to travel to some off-beat place each year" because they think that it is the fashionable thing to do.

Which of us has not been jostled by crowds in the Sistine Chapel or Westminster Abbey, or even at Stonehenge, and wished that he could be alone to savor these awesome places? But where the average traveler might be somewhat disconcerted, the antitechnologists react to these crowds as to a personal affront. Consider the tragedy that has befallen Mumford.

> Until now Delphi . . . presented one of the most wonderful landscapes in the world: a landscape whose profound religious atmosphere remained, though the temples are ruined and the religion itself has passed away. But, speaking for myself, I don't dare go back to Delphi. I know that it has already become a parking lot, and in a few years all that made it so precious will, if our present habits continue, disappear. . . .

And pity poor Roszak for the dreadful indignity he has had to endure:

> A personal anecdote: a sign of the times. Several years ago, on a cross-country trip, my family and I were foolish enough to visit Yellowstone National Park during the summer crush. . . . There was not an inch of solitude or even minimal privacy to be found anywhere during the two days we stayed before giving up and leaving. Never once were we out of earshot of chattering throngs and transistor radios or beyond the odor of automobile exhaust. . . .

How nice it would be for a select few of us if Delphi and Yellowstone could be set aside for our personal enjoyment, with the masses restricted to places such as Coney Island, more suited to their coarser sensibilities. But unfortunately our fellow citizens will not grant us such special privileges. Certain places that cannot possibly handle crowds, or that would be seriously damaged by crowds, are restricted to select scholars or other people of special qualifications. But, in general, those of us who would be tourists have little choice but to learn to put up with others who have similar desires and equal rights. Fortunately, although Delphi may be crowded, there are a hundred other ruined Greek temples that are not, and if Roszak would only leave his car in the Yellowstone parking lot and hike a mile or two into the woods, he can still find all the wilderness he could desire.

If the situation is not quite as appalling as the antitechnologists make it out to be, certainly the annoyance and fear they feel does have some basis in fact. But since the cause of the problem is not technology, which can be restrained, but the pressure of human desire, which cannot be restrained, it is difficult to know what to do except to continue to muddle along as best we can.

The antitechnologists do not see things so pragmatically. In their apocalyptic view, technology has brought us to the brink of disaster, and only an abrupt change of course can save us. Their deceptive statement of the problem is bad enough, but their proposed solution —a change in human nature—is much worse. The antitechnologists' desire to change human nature follows logically from their fear of the accelerating demands of the multitudes. One feels that they would be relieved to have frontal lobotomies performed on all the grasping, ambitious, foolish people who will not harken to the antitechnological prophecies. Failing this, one wonders how they expect the change in human nature to occur.

If the first step is to be a scientific study of human nature, as Mumford and Dubos propose, what a strange scientific study that will be. Since the antitechnologists have decided in advance what human needs are, and have also agreed that the average man has a mistaken idea of what these needs are, one can scarcely imagine the sort of experiments they would devise.

With or without such a science, we know what the antitechnologists

want for mankind. They want serenity and spiritual peace. But man wants something more. He may seek serenity when he does have it. But as soon as he has it, he becomes restless and seeks some new adventure. No single way of life can satisfy him ultimately, least of all a return to the simple, rustic routines of earlier times.

The narrator of Dostoevsky's *Notes From Underground* speaks truly:

> . . . man is a frivolous and incongruous creature, and perhaps, like a chess-player, loves the process of the game, not the end of it. And who knows (there is no saying with certainty), perhaps the only goal on earth to which mankind is striving lies in this incessant process of attaining, in other words, in life itself. . . .

It is interesting that Mumford and Dubos both refer to this Dostoevsky story but misinterpret it to support their own view. They attribute the antisocial behavior of "the sniveling hero" (they both use the identical phrase) to his dissatisfaction with a technological society. But the point is that Dostoevsky's character rejects not only the order and comfort of a technological society, but *every attempt* to define his needs and prescribe for his desires. It is improper to conclude from his scorn for the bourgeois life that he would welcome the neoprimitive utopias conjured up by the antitechnologists. He would ridicule their efforts to find a condition of lasting contentment for man.

> . . . man everywhere and at all times, whoever he may be, has preferred to act as he chose and not in the least as his reason and advantage dictated. And one may choose what is contrary to one's own interests, and sometimes one *positively ought* (that is my idea). One's own free unfettered choice, one's own caprice—however wild it may be, one's own fancy worked up at times to frenzy—is that very "most advantageous advantage" which we have overlooked, which comes under no classification and against which all systems and theories are continually being shattered to atoms.

If the antitechnologists hope to change human nature, they will not find technology standing in the way, but rather the caprice of which Dostoevsky speaks, the contrariness which makes fools of those who think that they have found the one right way.

The antitechnologists might protest that they stand with Dostoevsky, not against him. Is not their literature filled with praise of freedom? Yes, but it is a strangely restricted freedom—the freedom to pray or sing or dance or weave, for example, but not to go stock-car racing or visit Disneyland or Las Vegas; the freedom to plant barley or corn, but not to use a bulldozer or buy a new electric hair dryer. It is the half-freedom, the false freedom, of the benevolent despot.

Quiet Please!

The antitechnologists are not preaching totalitarianism. They are good and gentle men, humanists at heart. But their cry for "something like a spontaneous religious conversion" (Mumford), "a common faith" (Dubos), "Consciousness III . . . an attempt to gain transcendence" (Reich), "the visionary commonwealth" (Roszak) is a cry for a new "movement," and each new mass movement carries within itself the seeds of a new totalitarianism. Despots arise when certain conditions exist: widespread disillusionment with the existing society, identification of a scapegoat, and the dissemination by glib prophets of new visions of salvation.

It is not the prophets who become the despots, but despots arise who take advantage of the conditions created by the prophets. Just as dictators appear on the left and on the right, in the wake of religious fanaticism or antireligious fervor, so might one rise in the wake of despair stemming from antitechnology. Fear and disgust are what count, along with a scapegoat and pie-in-the-sky promises. If, practically speaking, despotism does not appear imminent, still the antitechnologists are lending their voices to the chorus of frustrated and frightened people who have lost faith in our institutions, and who are creating the conditions in which some sort of demagogue can rise to power.

The antitechnologists explicitly disavow any aggressive revolutionary activity. They announce the need for radical changes in our way of life, but for themselves and their followers they propose a quiet disengagement. Mumford calls, not for a revolt, but rather for "a steady withdrawal of interest, a slowing down of tempo, a stoppage of senseless routines and mindless acts." Dubos echoes this theme: "At heart, we often wish we had the courage to drop out and recapture our real selves. The impulse to withdraw from a way of life we know to be inhuman is probably so widespread that it will become a dominant social force in the future." To Reich, also, disengagement is the recommended procedure: "The plan, the program, the grand strategy, is this: resist the State, when you must, avoid it, when you can; but listen to music, dance, seek out nature, laugh, be happy, be beautiful. . . ." Roszak muses in the same vein: "As the old Gnosis comes back to mind in our time, once again people become—like most religious communitarians of the past—pacifist and anarchist. They disaffiliate, decentralize, cultivate nonviolent relationships, look after their own needs."

What if large numbers of good people *did* begin to withdraw as recommended by the antitechnologists? Such withdrawal, accompanied by cries of alarm, would only serve to make it easier for a demagogue to come to power. If a single tyrant does not come forward, then all the petty tyrants—the most selfish and aggressive ones—will speedily take over everything they can lay their hands on. It is foolhardy to assume that human nature will change spontaneously, to think that lions will lie down with lambs, when all the evidence of history as well as the experience of our daily lives tells us that it will not happen.

Reich contends that the human nature which evolved in a world of scarcity can change now that we live in a world of abundance. But this is nonsense, since we do not live in a world of abundance, and we can never hope to live in a world which contains an abundance of all the things that people want. People are capable of generous thoughts and noble actions, and all men of good will are engaged in the effort to increase the amount of human virtue in the world. But this effort, if it is not to degenerate into fatu-

ous piety, must include a recognition of the egoistic aggressiveness which exists in the scheme of things. How strange it is that the antitechnologists, who are enamored of nature, and who readily accept the behavior of leopards and vultures, are repelled by the idea that man, for all his angelic qualities, is self-seeking and competitive. It is not cynical to accept man as he is; it is prudent, yes, but reverent as well.

To the everlasting credit of man, he recognized early the imperfection of his character and set about finding ways of coping with it so as to enable himself to live harmoniously in large groups. For a long time spiritual and moral imperatives were declared by a succession of high-minded prophets. But then the philosophers of the Enlightenment, having observed that one man's faith always seemed to be another man's heresy, and that evangelism inevitably led to crusades, wars and inquisitions, declared that formal religious and philosophical movements must be prevented from playing a dominant role in the organization of the state. What a unique and noble idea that was! The American founding fathers, sons of the Enlightenment, believed that certain basic rights should be accorded to each citizen, but after that the course of civilization was to be left to the vagaries of human impulse, as expressed in the bittersweet phrase, "the pursuit of happiness."

We have been attempting to muddle along, acknowledging that we are selfish and foolish and proceeding by means of trial and error. We call ourselves pragmatists. Mistakes are made, of course. Also tastes change, so that what seemed desirable to one generation appears disagreeable to the next. But our overriding concern has been to make sure that matters of taste do not become matters of dogma, for that is the way toward violent conflict and tyranny.

Trial and error, however, is exactly what the antitechnologists cannot abide. Roszak speaks for them all when he complains of "the great paradox of the technological mystique: its remarkable ability to grow strong by virtue of chronic failure . . . the sum total of failures has the effect of increasing our dependence on technical expertise." Agreed. Each new thing we do must be observed, maintained, and its consequences coped with. But this is true of all activities, not only technology. Educators are constantly coming up with new theories on how to teach children to read and multiply, and new plans such as the one proposing open admissions to state universities. When the results begin to come in, including some that are unforseen and disappointing, there is a flurry of controversy and a whole flock of new theories from the experts. The same bewildering oscillation occurs in psychiatry, in law, in economics—in life. We try to learn from our mistakes, and to plan more effectively.

But the antitechnologists will have none of this, as Dubos makes clear:

> We may hope eventually to develop techniques for predicting or recognizing early the objectionable consequences of social and technological innovation so as to minimize their effects, but this kind of piecemeal social engineering will be no substitute for a philosophy of the whole environment, formulated in the light of human aspirations and needs.

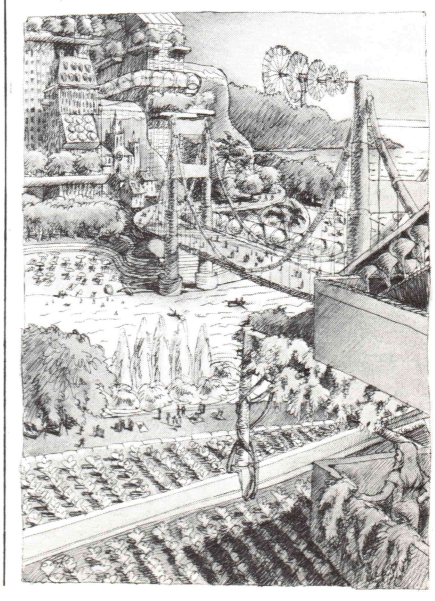
This has a wonderful ring to it, as do so many of the antitechnologists' grandiose pronouncements. Yet it is such dangerous advice. The passionate search for "a philosophy" is the very thing that is most likely to lead us down the dreadful path of dogma and totalitarianism.

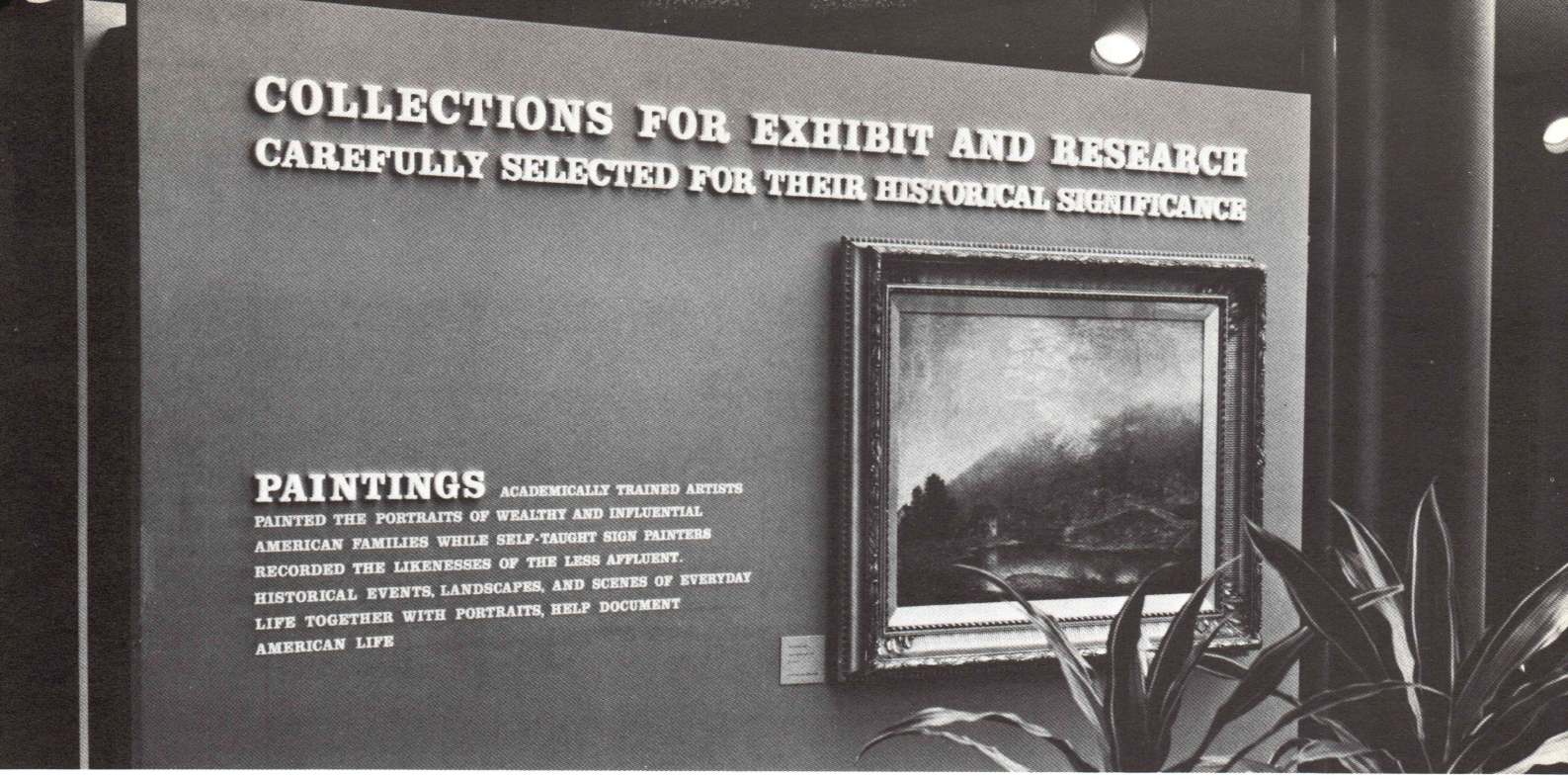
Our blundering, pragmatic democracy may be doomed to fail. The increasing demands of the masses may overwhelm us, despite all our resilience and ingenuity. In such an event we will have no choice but to change. The Chinese have shown us that a different way of life is possible. However, we must not deceive ourselves into thinking that we can undergo such a change, or maintain such a society, without the most bloody upheavals and repressions.

We are all frightened and unsure of ourselves, in need of good counsel. But where we require clear thinking and courage, the antitechnologists offer us fantasies and despair. Where we need an increase in mutual respect, they exhibit hatred for the powerful and contempt for the weak. The times demand more citizen activism, but they tend to recommend an aloof disengagement. We surely could use a sense of humor, but they are in the grip of an unrelenting dolefulness. Nevertheless, the antitechnologists have managed to gain a reputation for kindly wisdom.

This reputation is not entirely undeserved, since they do have many inspiring and interesting things to say. Their sentiments about nature, work, art, spirituality, and many of the good things in life, are generally splendid and difficult to quarrel with. Their ecological concerns are praiseworthy, and their cries of alarm have served some useful purpose. In sum, the antitechnologists are good men, and they mean well.

But, frightened and dismayed by the unfolding of the human drama in our time, yearning for simple solutions where there can be none, and refusing to acknowledge that the true source of our problems is nothing other than the irrepressible human will, they have deluded themselves with the doctrine of antitechnology. It is a hollow doctrine, the increasing popularity of which adds the dangers inherent in self-deception to all of the other dangers we already face. △





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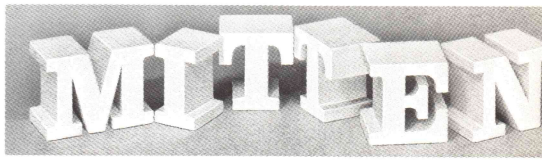

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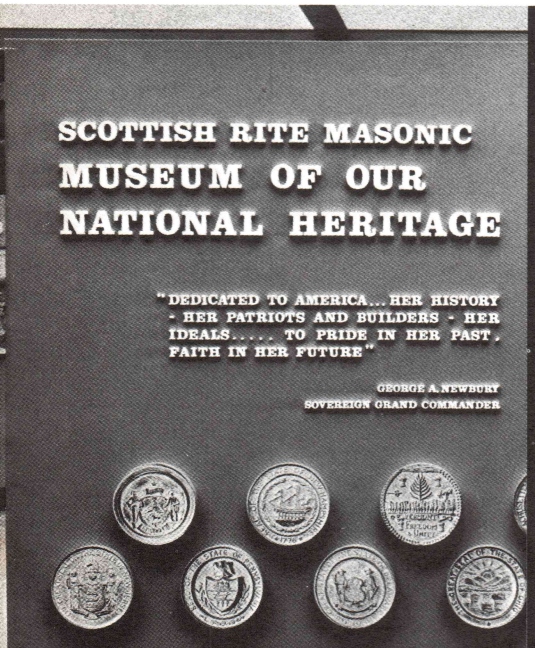

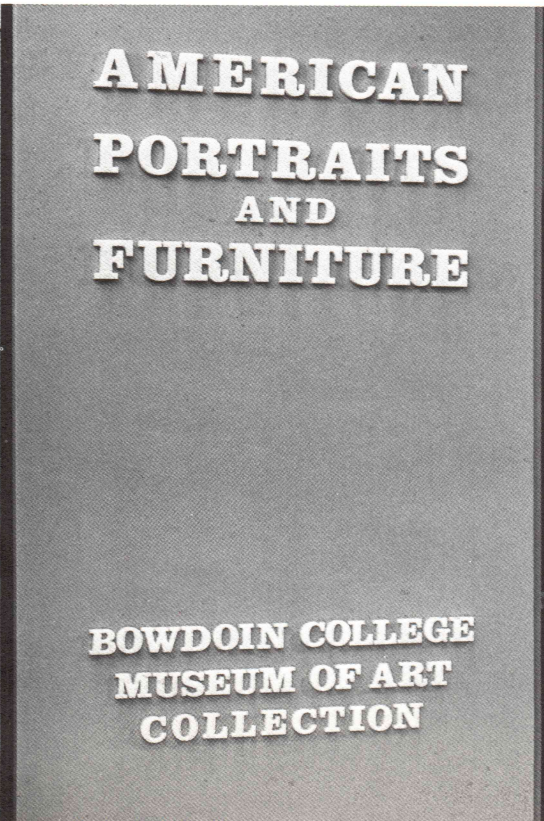

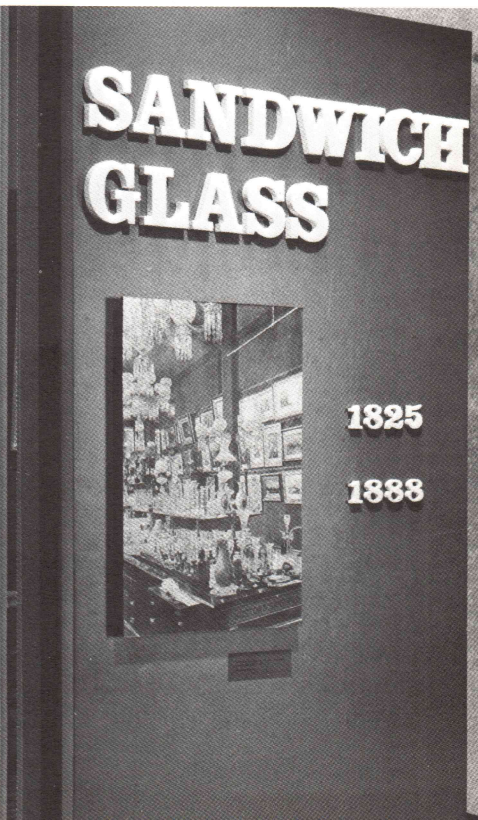

Film Programs: Where to Go for Help

Michael Webb

There is more to cinema than meets the public eye. Current releases and popular revivals are highly visible, but beneath the surface there is a vast and no less fascinating mass of classics, documentaries, experiments and new foreign films that will never be seen by the general public. Much of this hidden treasure is preserved in film archives or briefly exposed at international film festivals. Over 900 American universities offer courses in film, and almost as many books on film are readily available. Eighty years after its invention, the cinema has clearly demonstrated its unique value as a medium of communication and of artistic expression, as a vivid record of the past and as a mirror of our changing society. But it is impossible to review the history of film systematically, as art or literature is reviewed, and it is difficult to appreciate fully the extraordinary vitality of the current scene. Commercial movie houses are concerned only with the popular cinema; television presents pale, diminished shadows; university film societies are generally accessible only to students.

Museums can fill the void, explore cinema as art, present it to an eager and growing audience. The Museum of Modern Art in New York, the Art Institute of Chicago, the Los Angeles County Museum of Art, the Boston Museum of Fine Arts, among others, have flourishing film programs—imaginatively selected, professionally presented, enthusiastically supported. These programs have

Michael Webb *has been film programing manager of the American Film Institute in Washington, D.C. for seven years. He is in charge of the* AFI *Theater at the Kennedy Center, which presents over 600 films a year, and develops touring film programs that are presented in museums and other nonprofit institutions around the country.*

increased the museum's impact on the community, attracted a new and younger audience, and have increased museum membership.

Despite this evidence that film is an appropriate and even profitable component of museum programs, many museum directors have dragged their feet, judging films to be merely commercial entertainment or fearing that costs would be prohibitive. If a museum has a film program, it often is noted briefly at the end of the monthly calendar, and consists of poor-quality prints projected (badly) by the staff electrician. That is akin to displaying reproductions of great paintings in a poorly lit corridor. It is as unworthy of film as an art as it is of the museum's commitment to excellence.

During the past three years, the American Film Institute has worked closely with leading museums around the country, helping them upgrade their film facilities, offering technical and programing advice and sharing programs of American classics and new foreign films. These have included programs of archive classics, a tribute to the Hollywood cameraman and the Astaire-Rogers musicals (all funded by a grant from Exxon Corporation), and new films from Poland, Egypt and the Soviet Union. The emphasis has been on quality: the finest 35mm prints, professionally projected; informative program notes, attractive fliers and posters; live musical accompaniment and variable-speed projection for silent films. AFI is eager to help other museums achieve these same high standards.

But museum film programs come in many different formats. No one model is universally applicable. The Whitney Museum of American Art in New York City shows films every day for eight months of the year, and concentrates on premieres of independent American shorts and features, running each program for one or two weeks. The museum functions as a noncommercial first-

run showcase, launching unfamiliar talents and generating valuable publicity and income for living artists. A selection of 200 new films and a seven-program history of the avant-garde, first presented at the Whitney, can be rented from the American Federation of Arts. AFA can also provide speakers and informative catalogs.

The Hirshhorn Museum and Sculpture Garden in Washington, D.C., has developed a highly successful two-day-a-week program of short films by or about artists. The Carnegie Institute in Pittsburgh also emphasizes independent and experimental cinema, and circulates a list of filmmakers available to introduce programs of their work.

Several museums, including the Museum of Modern Art, the Art Institute of Chicago, the International Museum of Photography in Rochester, New York, and the Pacific Film Archive at the University Art Museum in Berkeley, California, house archives and study centers. MOMA, which has the oldest and richest of museum film programs, also has a distribution library of classics and experimental films.

Highly successful programs also are presented at the Indianapolis Museum of Art; the Wadsworth Atheneum, Hartford, Connecticut; the Detroit Institute of Arts; and the Walker Art Center, Minneapolis. In each, there is a balance between old and new, rare and classic, foreign and American, mainstream and experimental. The programs celebrate the diversity of film, its unique capacity to involve audiences at many levels of experience, its integral connections with history, society and the other arts.

But too few museums have followed their example. Many have neglected to use existing facilities. Palatial new buildings are created with no thought for film projection. Yet the cost of film facilities need not be excessive. A suitable auditorium can be equipped with screen, sound system, and 16mm and 35mm projectors for as little as $20,000. It is possible to make a start—with 16mm equipment only—for much less. Several museums have obtained grants to cover the cost of such improvements. The AFI has technical fact sheets and can recommend expert consultants who will work with architects and museum staff to save money and achieve better results.

Annual operating costs—including staff, overhead, film shipping and rental, program notes and fliers—range from $30,000 to $100,000 a year in the more ambitious programs cited above, MOMA excluded. Most of the expense usually is recovered in admittance revenue, and once a program has been operating for a year it is eligible to apply to the National Endowment for the Arts for a matching grant of up to $25,000. A film program can easily cover its net costs, and generate additional membership income. As an alternative to renting, many films (particularly independent shorts and features) can be leased or purchased outright for approximately seven to 10 times rental cost. Many museums have begun to build permanent collections for exhibition and study purposes.

Good film programs usually reflect the energy and expertise of one or two individuals: no area of museum activity depends so much on personal creativity. A programmer must combine the talents of historian, tastemaker, market researcher, street-trader, publicist, technician and diplomat. He or she must select a balanced program from an enormous range of possibilities, bargain for favorable terms and good prints, monitor the theater operation (especially the handling and projection of prints), balance

occupies as important a place in the museum as painting, sculpture and the applied arts.

Information on Films and Videotapes Still Wanted

Marjorie Hoachlander's *Media* column in the March/April MUSEUM NEWS called for details of films and videotapes produced by museums. Since postal delivery of the magazine is often slow, the April 30 deadline for receipt of information proved to be difficult for many institutions to meet. Therefore, the deadline has been extended to September 1. Please continue to forward information to the AAM, c/o Museum Films and Videotapes, attaching the coupon on page 50 of the March/April issue. Include the title of the production, name of producer/director, description of content, date of production, running time, format, color or black-and-white, distribution source, terms of sale, rental or loan, suggestions for use.

the budget, develop attractive and informative promotional materials, educate and enlarge the filmgoing audience, and maintain good relations with local commercial theaters, persuading them that the museum will help rather than encroach upon their business. Too many museums damage their chances by failing to select the right person or vesting authority in a committee.

Any programmer will find that help is available from a number of sources (see the list of model theaters and information resources below). There are indices and catalogs; the AFI and several leading museums and study centers offer free information on print availability and condition. The programmer can subscribe to such well-documented program brochures as those of the AFI Theater, the Pacific Film Archive and the Los Angeles County Museum, to supplement his or her own programing ideas. But most essential is the support and encouragement of the museum's director, and the recognition that film

Model Theaters and Information Resources

American Federation of Arts, 41 E. 65th St., New York, N.Y. 10021. Tel.: 212-988-7700. (Steve Aronson)

American Film Institute, Kennedy Center, Washington, D.C. 20566. Tel.: 202-833-9300. (Bob Leverone; touring programs, information service)

Art Institute of Chicago, School of the Art Institute, Michigan Avenue at Adams Street, Chicago, Ill. 60603. Tel.: 312-236-7080. (Camille Cook, Ruby Rich)

Library of Congress, Motion Picture Section, Library of Congress Annex, Washington, D.C. 20540. Tel.: 202-426-5840. (Barbara Humphreys)

Los Angeles County Museum of Art, 5905 Wilshire Blvd., Los Angeles, Calif. 90036. Tel.: 213-937-4250. (Ron Haver)

Museum of Modern Art, Film Department, 11 W. 53rd St., New York, N.Y. 10019. Tel.: 212-956-6100.

Museum of Art, Carnegie Institute, 4400 Forbes Ave., Pittsburgh, Pa. 15213. Tel.: 412-622-3200. (Sam Choi, Bill Judson)

North-West Film Study Center and Art Museum, 651 N.W. Culpepper Terr., Portland, Oreg. 97210. Tel.: 503-226-2811.

Pacific Film Archive, University Art Museum at Berkeley, Berkeley, Calif. 94720. Tel.: 415-642-1412.

University Film Study Center, 18 Vassar, Cambridge, Mass. 02139. Tel.: 617-253-7612.

Whitney Museum of American Art, Madison Avenue at 75th Street, New York, N.Y. 10021. Tel.: 212-794-0617. (Mark Segal, John Hanhardt) △

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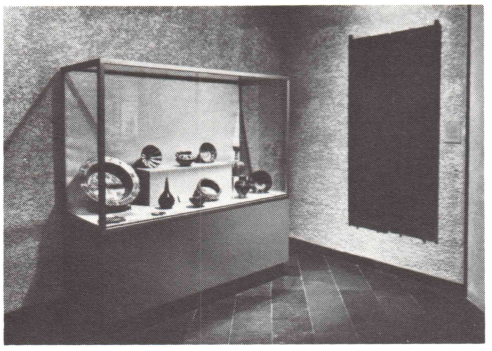

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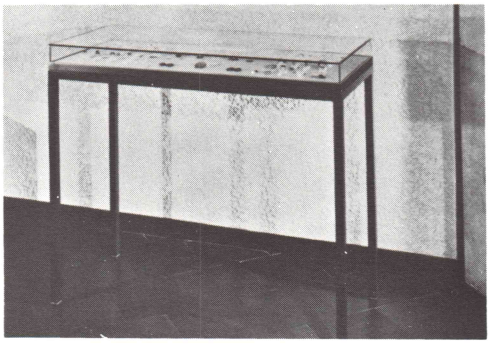

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Museum News Index

Feature articles and bylined departments that appeared in MUSEUM NEWS from September, 1974 through June, 1975 (Volume 53) and from September/October, 1975 through July/August, 1976 (Volume 54) are indexed by author and by subject matter. Books reviewed are listed by title.

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J. J. Brody *is director of the Maxwell Museum of Anthropology, Albuquerque, New Mexico.* **Louis F. Gorr** *is superintendent of history/director of museums for the Fairfax County (Virginia) Park Authority.* **Robin Lynn** *is program coordinator with the Smithsonian Institution Traveling Exhibition Service (SITES). AAM President* **Joseph Veach Noble** *is director of the Museum of the City of New York.* **Robert Ronsheim** *has worked as a historian for the National Park Service, education director at Plimoth Plantation and training services coordinator for Boston 200.* **Lorna J. Sass** *teaches English at Queens College. Her medieval cookbook,* To the King's Taste, *published by the Metropolitan Museum, was named one of 50 books of the year by the American Institute of Graphic Arts.* **Adele Z. Silver** *is editor, education publications and senior instructor at the Cleveland Museum of Art.*

A Social History of Museums, *by Kenneth Hudson. Humanities Press, Inc., 1975. 210 pp., $15.*

A British journalist and lecturer best known in this country as co-author (with Ann Nicholls) of the *Directory of Museums,* Hudson has a good idea: to write a history of museums from the visitor's point of view rather than that of the museum professional. His primary point is that museums don't know their audiences and ought to. To support this thesis, Hudson draws on the aristocratic beginnings of museums in Western Europe as the basis of museum uneasiness with the "mass" audience.

Surveys and "feedback" are essential, he argues, and he offers some provocative tidbits from early descriptions of museum experiences by visitors—or would-be visitors, as in an August 26, 1851, letter to the editors of *The Times* of London, from a servant who signed himself "A Country Groom." Excited by the descriptions of the Great Exhibition he'd read about in his master's newspaper, but disappointed by the railroad schedule, among other things, that kept him and his fellow servants from attending, the groom wrote: "Master cant spare us, and we cant spare the monney." And in a postscript: "Only one servant out of use five has been up yet, and we cant if it isent altered. If you alter this and put in in propper it will do good."

A good idea that seeks to do good is not, however, sufficient to make a book good, or as good as it ought to be. Hudson has mucked about in some fascinating research archives, come up with interesting anecdotes and useful descriptions of old museum arrangements, but the result is a poorly organized and disappointing book (and careless, too: at least some of the footnotes are incorrectly numbered, casting doubt on the accuracy of other aspects of the book). A muddle, but a readable one.—*Adele Z. Silver* △

Conducting the People's Business: The Framework and Functions of Public Administration, *edited by William G. Hills, Voyle C. Scurlock, Harold D. Viaille, James A. West. University of Oklahoma Press, 1975. 492 pp., $19.95.*

Consumers and Social Services, *by Robert Perlman. John Wiley and Sons, Inc., 1975. 126 pp., paperbound, $11.*

Standards of Accounting and Financial Reporting for Voluntary Health and Welfare Organizations, *revised 1974. National Health Council, Inc., National Assembly of National Voluntary Health and Social Welfare Organizations, Inc., United Way of America, 1975. 135 pp., $5. Order from National Health Council, 1740 Broadway, New York, N.Y. 10019.*

Accounting and Financial Reporting: A Guide for United Ways and Not-for-Profit Human Service Organizations. *United Way of America, 1974. 195 pp., $15.*

Fund Accounting: Theory and Practice, *by Edward S. Lynn and Robert J. Freeman. Prentice-Hall, 1974. 1,008 pp., $18.95.*

Financial and Accounting Guide for Non-Profit Organizations, *2nd edition, by Malvern J. Gross. Ronald Press Co., 572 pp., $14.50.*

Of the many sectors represented in the complex of nonprofit educational and esthetic professions, museums seem to be most deficient in the dissemination of information. One of the hallmarks of any profession is a body of written, readily accessible knowledge, related both to abstract concepts and to their practical application. In the museum field there is little conceptual or practical knowledge that is shared formally among museum workers. The literature of our profession barely exceeds the trivial catalog or the amateurish how-to-do-it pamphlet.

There is almost no literature—conceptual or practical—dealing with museum management. This may be attributable to the fact that most museum administrators are either ex-curators or have entered museum work from other nonprofit organizations. It may also be attributable to the tendency of museum people to consider administration a mere exercise in coordinating the efforts of the various departments of an institution, insuring communication and keeping the books straight. The museum directorship

is seen as a necessary evil to free the professional staff from mundane administrative chores.

In reality, however, "administration" is not enough. A museum must be *managed* as any other nonprofit or profitmaking organization would be managed. Management is the active direction of an organization's departments to achieve specific goals and objectives, within a realistic budget and following a practical schedule. Management musters all parts of a museum to professional activities for the good of the total organization rather than for any single department. Management blends human, cultural and financial resources into a coherent body; it binds the diverse representatives of a museum's specialities into an efficient team to enable them to achieve their respective goals; it provides a viable structure to generate and apportion money to accomplish the museum's purposes. Management is committed to neutralizing the violent opposites that are already destroying some museums: declining fiscal resources and increasing demand for services.

It is within this context that the following selection of books is reviewed.

Conducting the People's Business is a textbook-anthology on public administration and is intended for the working manager of a not-for-profit organization. It focuses on the functions of public administration—planning, organizing, controlling, developing and directing human resources. Sixty-two articles are organized in a format designed for the study of real-life problems that may be encountered in the management of public institutions. The problems of the head of a public agency are not unlike those of a museum director, although they may be large-scale and have greater impact.

The editors have assembled a worthwhile book, its chief virtue being its emphasis on the fact that management occurs at many levels in an organization, not just at the top. More museum workers in supervisory positions at all levels should be aware of (and practice)

the fundamentals of sound management. They should not necessarily be involved in weighty professional issues, but rather, they should acquire basic management skills in order to maintain the integrity of the organization.

Museums, like government and administrative agencies, frequently lose sight of the purposes for which they exist, or they tend to redefine those purposes in terms of their own special interests. The value of *Conducting the People's Business* is to reverse that tendency.

Consumers and Social Services is a provocative analysis of the relationship between the institution and the consumer. While directed at social welfare organizations, the book is sufficiently broad in its discussion to be of considerable use to the museum executive and trustee concerned with institutional policy. Specifically, the main questions developed are these: How are consumers' expectations fulfilled or thwarted by the ways in which services are provided? Are there costs that consumers pay even when services are "free of charge"? How do consumers differ? How do service organizations respond when confronted with consumer demands that exceed their capacities?

Within the context of these questions, Perlman discusses access to services, program assessment and evaluation, and planning. Of particular interest is his analysis of organizational and resource constraints on those functions.

With lack of money being perhaps the single most serious crisis facing museums today, it is imperative that museum managers become more proficient at handling the funds they do have. Museums exist at the expense of other public services and must compete for scarce public funds. They are public institutions regardless of some institutions' "private" status and are accountable to the public for their finances. For managing finances or for detailing transactions in the annual report the museum manager requires more than basic bookkeeping knowledge.

Standards of Accounting and Financial Reporting for Voluntary Health and Welfare Organizations and *Accounting and Financial Reporting: A Guide for United Ways and Not-for-Profit Human Service Organizations* are important publications. They should be required reading for all museum personnel, especially those involved in financial work. As is true with many other nonprofit organizations, museums have no uniform standards of accounting and reporting. They should have, and these two books are intended to set standards.

Standards of Accounting is intended to assist health and welfare agencies (within which large category CPAs regard museums) in the recording of financial information and in the presentation of financial statements to the public. It emphasizes full, clear and articulate presentation of data and the need for uniformity of standards.

These principles, which are becoming increasingly widespread in their applications, are echoed in the excellent *Guide for United Ways*. This book builds a system of accounting and bookkeeping based upon the guidelines suggested in *Standards of Accounting*. It is a brief "how-to" book, aimed at the layman, and it lends coherence and intelligibility to the subject of money. This is important, for both museum personnel and the public need to understand clearly and simply what happens to the museum's money and the purpose for which it is earned

and spent. This is a book "about honesty, truth—all of it, not just part of it—and about pure and unadulterated objectivity." Clearly this is a lesson museums of all sizes could learn to good advantage.

Lynn's and Freeman's *Fund Accounting: Theory and Practice,* designed as a textbook, is extensive and thorough: it is also a valuable desk reference. It is a massive and intimidating book, but with a subject as complex as fund accounting there is no simple alternative. The fact that nonprofit organizations must use the concept of "funds"—restricted funds, shared funds and others—has complicated accounting and has contributed significantly to obfuscation in financial reports. This book discusses in great detail the procedure of fund accounting. It is a valuable companion to the previous two books.

Malvern Gross is a well-known iconoclast and has the uncanny ability to simplify the complex. His *Financial and Accounting Guide for Non-Profit Organizations* (second edition) is a standard and should be on the desk of every museum executive. Fund accounting is enormously complex—even in a small institution. However, Gross is emphatic in his belief that any financial statement "is a form of communication, and if this communication cannot be prepared in simple enough English so that the uninitiated reader will understand it, then it has failed in its principal purpose."

Gross' explanations in this excellent book are based on the American Institute of Certified Public Accountants' guides for accountants who audit the books of nonprofit organizations. This is an important feature, as it helps create standards against which museums can measure their financial reporting. There are detailed explanations of particular reporting and accounting problems faced by museums and other nonprofit organizations.

Gross proposes, among other heresies, that all legally unrestricted funds be reported as a single fund rather than arbitrarily as a series of separate funds; and that museums should capitalize their collections and reflect them on their balance sheets. While these suggestions will surely meet with resistance in museum circles (I have heard the same proposals booed at professional meetings), they offer a significant opportunity for communicating a museum's total financial posture to the public.

As did the first, the new edition includes detailed assistance in the preparation of tax forms, presents every state's compliance requirements, and offers a wealth of procedural advice on setting up and keeping the books, maintaining proper internal controls, developing and presenting a meaningful budget, and other such helpful topics.

Three publications reviewed in MUSEUM NEWS during the past year also deal with museum management: *Giving in America: Toward a Stronger Voluntary Sector* ("The Filer Commission Report: Is It Good for Museums?" May/June, 1976); *Museum Accounting Guidelines,* edited by Victor J. Danilov (*Books,* May/June, 1976); and *Marketing for Non-Profit Organizations,* by Philip Kotler (*Books,* January/February, 1976). Each of these should be on the desk of every museum executive.

If museum professionals, especially those in management, have some new vision of museums, they have kept it to themselves. Sub-professions sprout with regularity. There are "caucuses" for all museum specialties and new organizations appear replete with newsletters and memberships as if to supplant or ignore the museum profession itself. This phenomenon, in my opinion, springs from the failure of our profession to vigorously disseminate knowledge of itself throughout its membership. Our profession is knee deep in midgets.

About the only museum today that is still afloat and clearly on course is an obsolete refurbished boat berthed in the Baltimore Harbor:

the *USS Constellation*. The provocative and wide-ranging ideas found in these recent books will, I hope, contribute to keeping more museums afloat.—*Louis F. Gorr* △

The American Presidency in Political Cartoons: 1776-1976, *by Thomas C. Blaisdell, Jr., Peter Selz and Seminar. University Art Museum, Berkeley, 1976. 278 pp., illus., paperbound, $4.*

This is a textbook example of what a museum exhibition catalog ought to be. Both it and its exhibition were compiled by a committee (which is something worth pondering) at the University of California, Berkeley. Included were Peter Selz, then director of the museum; Thomas C. Blaisdell, Jr., an emeritus professor of political science; and a baker's dozen of graduate students. The catalog is fully illustrated with each picture accompanied by a short explanation written by one of the graduate students. There are two brief essays—one by Selz on the art and the other by Blaisdell on the politics exhibited—a brief bibliography and a cross-listing of each work by artist's name.

The catalog is a full and permanent record of a transitory event, perhaps preserving the exhibit's character more than is usually possible due to the nature of the artifacts. Nevertheless its real glory is the text that clearly and concisely explicates the exhibit theme. About the only negative criticism to be made is that it is poorly bound. My copy is falling apart like an old Pogo.—*J. J. Brody* △

A History of Dolls' Houses, *by Flora Gill Jacobs. Charles Scribner's Sons, 1976. 342 pp., illus., $8.95.*

Flora Gill Jacobs' *A History of Dolls' Houses* was originally published in 1953. Republished in 1965 to allow Jacobs to update the volume with the most current information, it was reissued in 1976. The 1976 and 1965 editions are identical. A comparison of the 1953 and 1965 editions, using the chapters cited as having been extensively revised, does not show a substantial change in emphasis. One would wish that in the intervening 23 years, Jacobs could have obtained better photographs and that the publishers could have edited the text more scrupulously.

The text itself is nothing if not complete. As the publisher's squib on the back cover says, "*A History of Dolls' Houses* is the standard work in its field and is the only book covering the entire subject." The book's scope is vast, spanning doll house history from Egyptian times to the present day. Particular countries are discussed in individual chapters (Netherlands and England), as are interiors of note (kitchens, shops and factories) and collectors of merit (Mrs. Thorne and Madame Rubenstein).

One problem with the text is that Jacobs has recounted every minute aspect of her research. Details of her correspondence with lengthy paragraphs are reproduced; irrelevant visual impressions are detailed; too-lengthy quotes from catalogs are given; and research that reached a dead end is recounted. One wishes that Jacobs had been able to write in as abbreviated a fashion as the miniature craftsmen had worked.

Although this edition contains more photographs than the previous one, images that present a sense of scale are still lacking (for example, a comparison of a miniature grandfather clock to a human's wrist watch). The photographs are not keyed within the text to allow one to easily refer to the corresponding illustration. Also, the labeling of photographs is too brief, with little interpretation provided within the captions.

In spite of these difficulties, the book is fun because the subject is fun. Jacobs has put her finger on the intrigue of miniatures: "The dolls' house, however, has more than mere smallness to recommend it. The ability to reflect, in a relatively limited amount of space . . . architecture, household furnishings, and innumerable customs is practical as well as appealing."

As a collector and not an architectural historian or decorative arts curator, the author's focus is often on the collector, the person for whom the house was made or the public's reaction to the house. However, she aptly describes the furnishings within each house and often describes the objects from which the Lilliputian items have been fashioned. Through the variety in houses and furniture, a panorama of the evolution of furniture and architecture is seen, simply by reading her descriptions.

With the increasing interest in collecting miniatures, this reissued book provides a needed overview of the world in miniature.—*Robin Lynn* △

Interpretation of Historic Sites, *by William T. Alderson and Shirley Payne Low. American Association for State and Local History, 1976. 189 pp., illus., paperbound, $6 (AASLH members, $4.50).*

To classify this small book as a "how-to" manual is not to demean it. The authors' concern is "with the very practical problems of developing and conducting interpretive programs at historic sites." Intended for the staff member responsible for finding solutions to those problems, this book should be an invaluable aid to beginning professionals. It is filled with suggestions on small but important questions, such as when and how to inform visitors about site rules.

Alderson and Low believe the most important decision in a preserva-

tion project is the establishment of a primary objective, which must be based on thorough research and sober study. Formal action by the governing body should reinforce the decision.

In chapters on planning interpretation, presenting the site and guiding school groups, the authors investigate the varied nature of visitors, importance of opening on time, costuming and role-playing. The theme, however, is the necessity of structuring the interpretive program so that visitors will receive information necessary to enhance their understanding of the past.

Three chapters discuss the selection, training and evaluation of interpreters. While dropping helpful hints, the authors emphasize the importance of interpreters and of organizing training to achieve the site's objectives. One appendix contains a sample of interpretive planning from the decision to acquire the site through a complete training program. Another is a model tour of the site.

Alderson and Low are gentle yet persuasive in insisting on the fundamentals, but are undogmatic when examining methods. They do have a bias toward structured methods as well as structured goals. Most discussions of methods and training are based on the assumption of a controlled guided tour. This complements their view that important details about a person or events lead to understanding. Such an approach is especially suited to what they call "documentary sites," areas connected with important figures or events.

This criticism is unfair, because Alderson and Low are treading where few have gone. They invite the sort of discussion and study that has been lacking in the profession. We are in their debt for breaking a path. Additionally, unless basic interpretative objectives are set and the interpretive staff is picked with care and properly trained, it hardly pays to be concerned about methods.

This emphasis is, perhaps, one reason why the book does not consider basing interpretation on topics suggested by visitor reaction to the site. This bias, if it is such, also helps explain why the samples in the appendices do not meet the standards set in the book.

Alderson and Low have provided a convincing and well-written case for those basics. It should be read by everyone involved in any aspect of historic sites and especially by those who have the ultimate control.—*Robert D. Ronsheim* △

All Around Town, A Walking Guide to Outdoor Sculpture in New York City, *by Joseph Lederer, photographs by Arley Bondarin. Charles Scribner's Sons, 1975. 243 pp., illus., $8.95 paperbound, $17.50 hardbound.*

One would hope that any book that is an equal combination of text and photographs is the result of a perfect marriage of words and images. In this case, I strongly recommend a divorce. The text is magnificent, for it is erudite and conscientious, colorful and accurate. The photographs, on the other hand, are mostly poor. On rare occasions they rise to the level of mediocrity. It is inconceivable how a publisher could arrive at such a poor mixture.

The sculptures of New York City are extraordinary in their quality, diversity and settings as well as for the outstanding artists who created them. The author has very successfully written a text which gives the backgrounds of the sculptors, describes the works and their environment and places them in an artistic and sociological context. In addition, excellent maps serve as guides to locate the sites throughout the city.

On the other hand, the photographer was apparently reared in the neo-realist documentary school and is completely devoid of any sensitivity or interest in the sculptures themselves. Consequently, if he could photograph a work against a distracting background, he did so. If graffiti defaced a statue, he shot it to feature the graffiti. If construction debris could be located anywhere near the piece, he shot so the rubble appeared in the foreground. Finally, he made a very deliberate study of the sun so that when it was at the worst possible angle, casting the faces in shadow, he then took the picture. The best that can be said is that one can usually tell what piece he is photographing. —*Joseph Veach Noble* △

The Medieval Health Handbook Tacuinum Sanitatis, *introduction by Luisa Cogliati Arano. Translated and adapted by Oscar Ratti and Adele Westbrook from the original Italian edition. George Braziller, Inc., 1976. 153 pp., illus., $25.*

In the introduction to *The Medieval Health Handbook,* a scholar's definition of illuminated manuscripts is quoted: "[They provide] a museum richer than all others . . . where the scenes are in the thousands, witnesses of life in all its forms, recording ten centuries of history." Almost 300 plates (48 color, 243 black-and-white) from five manuscript versions of *Tacuinum sanitatis* are reproduced in this handsome volume. The pictures, each a direct pictorial response to the text, provide vignettes of daily life in the late Middle Ages: picking sour cherries; preparing pasta and ricotta; purchasing oil of almonds; tailoring cloth of wool and linen.

The modern dictum, "You are what you eat," has its roots in illustrated tables of health like the *Tacuinum sanitatis,* for medieval people believed that both health and temperament were regulated by diet. Food was classified moist or dry, hot or cold, according to an elaborate theory of "humours." "Doctors of physic" worked on the supposition that appetite was modified by heat and dryness, digestion by heat and moisture, retention by coldness and dryness, and expulsion by moisture and coldness. If there is one aspect of the introductory material missing in *The Medieval Health Handbook,* it is a short explanation of this theory to provide the reader with a theoretical framework for

Coming in September/October

MUSEUM NEWS will look at learning environments out side the museum:

- the Noguchi sculptural play environment in Atlanta, Georgia
- a National Park Service program that permits young people to spend the night in a park and role-play the lives of earlier settlers
- *Rites of Passage*—five community exhibitions organized by the Philadelphia Museum of Art and community groups which will be displayed around and about the city

understanding the written text.

We learn that lettuce "is cold and humid in the second degree, relieves insomnia and spermatorrhea, and is harmful to coitus and to the eyesight." The prescriptions are as entertaining as the pictures, and provide a fascinating insight into the history of herbal medicine.

Accompanying each illumination is a description of the food depicted. For example, under a delightful miniature of a woman picking beets, we are told that the vegetables have the following characteristics:

Nature: Warm and dry in the first degree. *Optimum:* Those with a sweet taste. *Usefulness:* Their juice eliminates dandruff. *Dangers:* They set the blood on fire. *Neutralization of the Dangers:* With vinegar and mustard.

The 45-page introductory essay is of particular interest to the art historian. The provenance of the five manuscripts (Rouen, Liége, Vienna, Paris and Casanatense) is discussed in detail, as are the schools of painting and artistic styles represented by each. As the first to reproduce the entire contents of the Liége and Rouen manuscripts, this edition is especially noteworthy. To ease comparison of the visual material, plates from different manuscripts depicting analogous scenes have been placed on facing pages.

For art historians interested in medieval painting, for social historians seeking a valuable glimpse of medieval "life in the round," and for gastronomes wishing to improve their health and temperament, *The Medieval Health Handbook* is a welcome addition to coffee table and library.—*Lorna J. Sass* △

Danilov, *continued from page 37*

jects and information panels, with some participatory devices, scale models and working replicas and a few artifacts. The exhibits function as teaching props for lecturer-demonstrators who explain the history, nature and opportunities of such fields as chemistry, electronics, metallurgy, construction, watchmaking and shipping. A special exhibit on the atom explains nuclear energy and its peaceful uses.

The most unusual of the European science centers is the Evoluon, housed in a large mushroom-shaped

structure in Eindhoven, the Netherlands. It was created in 1966 to celebrate the 75th anniversary of the Dutch-based Philips electronics company. Although founded and funded by a corporation, the Evoluon functions primarily as a science education center, using the most sophisticated exhibit techniques.

The exhibits, most of which are located on three circular balconies, trace man's scientific and technological progress, discuss societal and environmental impact, and look at the future. The top balcony, "People and Technology," deals with the changes brought by advances in the areas of health, home life, recreation, education, communications and transportation. Special platforms on this level explain the origin, nature and growth of research in the physical and life sciences. The middle balcony, called simply "Technology," contains participatory exhibits on sound and vibrations, light and lighting, matter and materials, electrons, electronic systems and manufacturing. Exhibits pertaining to the development of the Philips company and its products are located on the lower level.

The ground floor of the Evoluon features a children's section, "Prelude to Technology," with interactive exhibit units similar to the Children's Gallery at the London Science Museum. Youngsters perform experiments, play science-oriented games and learn about scientific principles and technological applications in the process.

The Evoluon has the advantage of having been constructed at one time, with adequate resources, and having a clear-cup objective established by a single benefactor. As a result, there is greater interaction between exhibit units, and a variety of participatory techniques—such as producing energy by pedaling a bicycle, converting sound into electric impulses and interacting with an environment diorama.

A Quiet Revolution

The science and technology museum field has undergone a quiet revolution since Richards wrote his treatise on industrial museums in 1925. The number of institutions has grown, contemporary science centers have emerged, and new participatory exhibit techniques frequently are used.

But in spite of the innovations visible in some museums, most of Europe's technical, industrial and science institutions have been slow to experiment and to adopt new techniques. Perhaps the most important reason for this hesitancy is the fact that many European science and technology museums are government operated. They are the official repositories for their nations' scientific, industrial and technological treasures, a responsibility that allows little room for innovation.

Other factors also inhibit innovation and discourage change. There is a traditional curatorial reluctance to engage in activities that might bring scorn from museum colleagues. Some professionals still believe that hands-on exhibit techniques and the deemphasis of artifacts are inappropriate for museums. Even museum directors who *would* like to modernize their institutions face government resistance and lack of funds. It is difficult to change the directions of an operating museum, so many of the innovations in science-technology museums originate in newly established institutions. Another factor that discourages innovation and change is the relatively small number of science and technology institutions in any one country.

American museums seem to have followed Charles Richards' advice, and as a result, many of the most exciting new developments in the science and technology museum field are occurring in America rather than in Europe. Museum professionals from abroad now come to this continent to adapt ideas for use by their new institutions. Although Europe's technical museums have not become contemporary science centers in the American sense, they have made significant contributions to the movement. Gradually, they are incorporating new techniques in an old world setting. △

Faul, *continued from page 17*

products to metric specifications. (The Chevette is the first U.S. metric automobile.) While in 1970 the National Soft Drink Association found no industry interest in using the metric system, only a few years later two major producers of soft drinks, Seven-Up and Coca-Cola, began marketing their products in metric-size containers. IBM, Rockwell International, J. C. Penney and Sears are among the corporations that have publicly stated their metric intentions.

There has been, and will continue to be, some resistance to the metric system. Thirty years after France adopted the system, John Quincy Adams observed, "The French nation has refused to learn, or to repeat these twelve words [the basic metric units]. They have been willing to take a total and radical change of things; but they insist upon calling them by old names. They take the metre but they must call one-third of it a foot. They accept the kilogramme but instead of pronouncing its name, they choose to call one-half of it a pound." To this day in Europe, 500 grams is still called a pound. △

Advertising Index

AND NOW FOR THE GOOD NEWS . . .

McKnight, 3M foundations give to Science Center

Two gifts totaling $3.3 million have been received by The Science Museum of Minnesota to build and equip a science center planned as part of the museum's new $12.8 million complex to be built at Wabasha and 10th Streets.

The McKnight Foundation contributed $2.15 million and the 3M Foundation has pledged $1.15 million, payable over a five-year period.

E. E. Titcomb, museum president, in making the announcement, said the gifts will be used to build and equip a science tower to be named the William L. McKnight-3M Science Center. Total cost of the center will be about $4.5 million and will include $1.125 million pledged by the Ober Charitable Foundation in January to help equip it.

The McKnight gift is one of the largest ever received by a cultural institution in the Twin Cities, Titcomb said.

The structure will be capped by a 76-foot dome containing a 70mm film projection system, a new type of star ball that does not intrude into the audience's line of vision, and dozens of slide projectors and special effects generators. The complex installation, controlled by computer, is expected to draw an audience of more than half-a-million each year.

The 100-seat auditorium and orientation-lecture hall will be used for the popular Museum Theater presently operated by the institution, said Titcomb.

HE SAID only one similar installation exists today, the Reuben H. Fleet Space Theater in San Diego.

The new center will contain exhibit halls, laboratories and classrooms and will be connected to the present structure by a pedestrian skywalk.

Russell Ewald, executive vice president of the McKnight Foundation, said the grant "underscores Mr. McKnight's lifelong commitment to research and science . . . which contributed to his and 3M's success."

Raymond Herzog, chairman and chief executive officer of 3M Company, added, "The application of science has contributed much toward raising the standard of living in Minnesota and the world during this century . . . We feel that the brain industries which have played such an important role in the growth of Minnesota have proved the value of privately financed research and development in our society."

"THE WILLIAM L. McKNIGHT-3M Science Center will dramatically portray the role of science in every person's life. It can also stimulate students' interest in pursuing scientific courses and careers," he added.

Construction of the center is expected to begin in mid-1976, with the formal opening scheduled for late 1977 or early 1978.

The overall museum complex, which includes three additional floors of exhibit space and assumption of the facilities in the current Arts and Science Center at 30 E. 10th St., is part of the development of block 7A by the St. Paul Housing and Redevelopment Authority.

Present plans call of the city of St. Paul to build parking for about 600 cars under the block, with the museum, a medical office building related to St. Joseph's Hospital, and a medium-income high-rise apartment building on the block.

"THIS IS TRULY a community project," Titcomb said. "The William L. McKnight-3M Science Center, will, in the very best sense, be a community center. The other construction on this block is also designed to serve community needs.

"It has received strong support from city officials including the HRA, the Downtown Development District, the City Council and Mayor Lawrence Cohen," he said. "This support, coupled with the generous contributions today from the McKnight Foundation and 3M Company, will make it possible for the Science Museum of Minnesota to proceed with its plans."

St. Paul Dispatch

$1-million grant given to St. Paul arts council

The Bush Foundation of St. Paul has made a $1-million grant to the St. Paul-Ramsey Council of Arts and Sciences to support renovation of St. Paul's Old Federal Courts Building and expansion of the Science Museum of Minnesota.

The science museum will use its $500,000 grant to build a space center, with a planetarium and audio-visual equipment.

The other $500,000 will be used in the general renovation of the building, a turn-of-the-century structure that the federal government sold to the city of St. Paul several years ago for $1. It cost nearly $2.5 million to build. The building will house the council and most of its member organizations.

Of the $1 million, $750,000 is an outright grant. For every dollar of the $250,000 grant, the council must raise $5. Both grants will be over three years.

Minneapolis Tribune

Courts Building, Science Museum to get grants

The St. Paul Foundation Monday announced allocation of $1,500,000 to help finance two downtown projects—renovation of the Old Federal Courts Building and expansion of the Science Museum of Minnesota.

The grants are for $750,000 apiece, according to Richard Moore, president of the nonprofit community foundation. They will be payable over a four-year period.

The grant for the Old Federal Courts Building is on a matching basis. The building will be closed this summer for the renovation work and may be opened in time for the Bicentennial observance in 1976.

The Science Museum expansion, involving a new museum and theater-planetarium across Wabasha Street from the present Arts and Science Center, is expected to begin next year.

St. Paul Pioneer Press

Science Museum gets $1.2 million

Two grants totaling $1.2 million from the Ober Charitable Foundation to the Science Museum of Minnesota were announced today by Paul A. Verrett, secretary of the foundation.

A $1.125-million grant was made to the museum to help finance a $8.8 million long-range expansion plan involving construction of a space theater-planetarium at Wabasha and 10th just west of the museum's present site.

Another grant of $75,000 was made to defray this year's planning and "start-up costs" connected with the expansion, Verrett said.

Terms of the larger grant call for the museum to raise $6 million in matching funds by 1981. Verrett said the $1.125 million grant is the largest the foundation has ever made.

The foundation was founded in 1969 by the late Agnes E. Ober to help promote educational, religious, scientific, literary and other charitable purposes.

St. Paul Dispatch

THOUGHTFUL AMERICANS ARE STILL GIVING!